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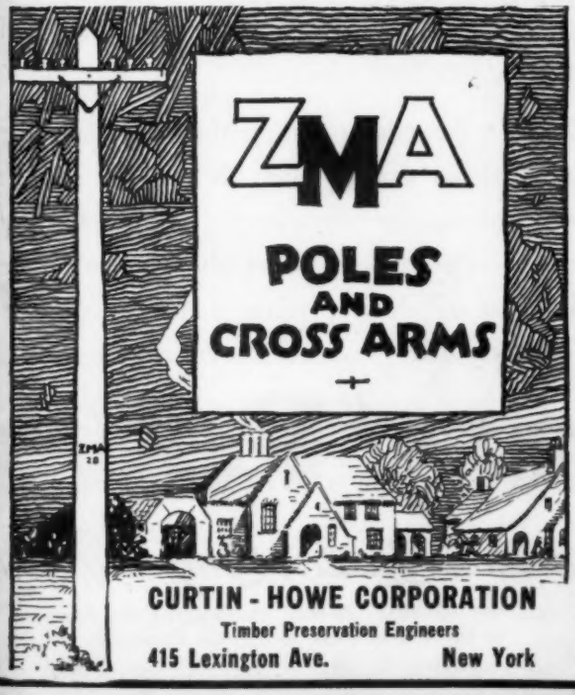

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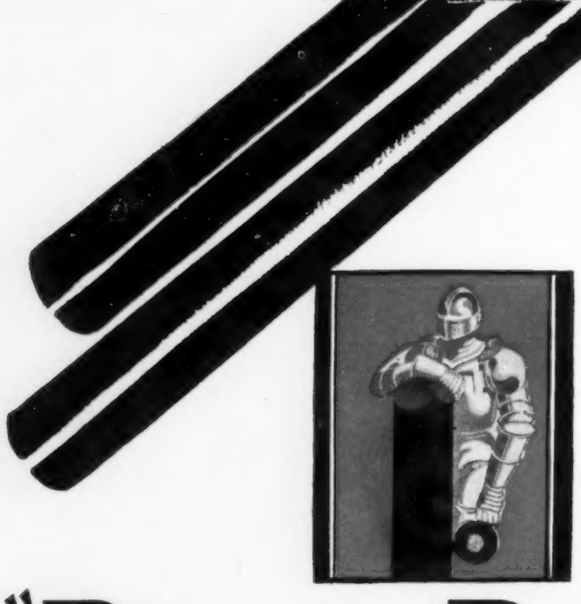

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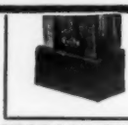

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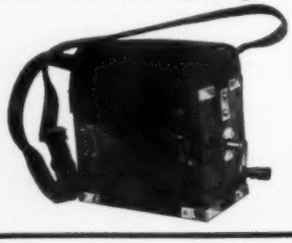

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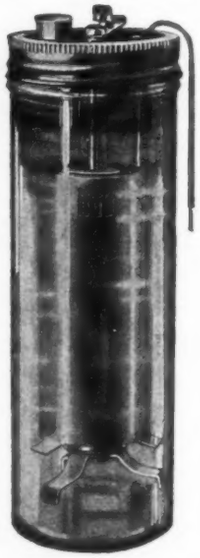

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Telephone Engineer

Volume 34 JANUARY, 1930 No. 1

A Word for the Salesman In his annual address to the Illinois Telephone Association, President Louis Pitcher of that association paid a tribute to one of the contributors to the development of Independent telephony who is often forgotten when credit is being distributed. He referred to the traveling salesman for the manufacturing and distributing houses.

When the many more or less isolated telephone systems were being built up, the traveling salesman often represented the only contact which the telephone company had with the outside world. His visits were looked forward to not only because he was a good fellow but because he was a friend and advisor in the many perplexing problems of early day telephony. He usually was a man of practical telephone experience and he gathered information about the business in his travels which he was always ready to pass on to the local telephone man. How many knotty cases of trouble have been unraveled through his assistance. How many times after he has sold some switchboard parts or even an entire small switchboard, on his next trip has he taken off his coat and installed the equipment without charge of any kind except of good will? Many small plants were laid out entirely by salesmen who saw the prospect of an order. While he did all of these things because of an actual or potential order for the goods he had to sell, be it said to the everlasting credit of the tribe of telephone salesmen, that he seldom yielded to the temptation to oversell his customer.

Some telephone managers have told us that the telephone salesman seems to be disappearing. Not so many of his kind are now on the road and calls are farther between. There is no doubt that the grouping of telephone companies and centralized buying has restricted the opportunity for the regular territorial sales representative. Likewise there seems to be a tendency toward grouping sales engineers in district headquarters to go out on specific calls rather than to depend entirely upon the local representative who makes regular rounds of his territory.

We are not saying that this is not as it should be. Times and customs do change and the traveling salesman does not have just the same place that he had twenty or thirty years ago. But, for all that, we are sure that we will be joined heartily by most old-time telephone men when we express the hope that the species "telephone traveling man" may never reach or approach the point of extinction.

The Chain Store Telephone We have no special love for the chain store, particularly the chain grocery store. Many of its business practices seem to us to be out of line with modern thought in business. But we have hope that the servants of the modern Moloch, misnamed efficiency who guide the destinies of some of the chain stores may some day come to a realization that there is a human side to business and that lasting success can not be built up on the foundation of oppression of producers, ruination of competitors and imposition on neighbors.

That is not what we started to say. The point that we are really trying to make in this comment is that we do not understand why those efficient gentlemen who figure out ways to bring the public to making its purchases at the chain grocery stores have overlooked the telephone. This is not true of all chains, as some of the smaller ones have learned that the telephone is a real adjunct to their business.

"But," you may say, "cash and carry stores do not take orders over the telephone." "Don't they, though," we might answer somewhat ungrammatically. We know the manager of a chain store who spends half an hour to an hour at his private residence telephone taking orders to be made up ready for some one to call for the goods the next day. We know of chain store managers being called to near-by telephones to take orders of the same kind.

We know that other calls would be made if the chain stores had telephones.

Please understand we are not suggesting to the chain store people that we know more about their business than they know, nor are we trying to tell them that they ought to put in telephones. Far from that; we are merely wondering how they happened to overlook a good bet.

Learning from the Annual Inventory

We do not think that the suggestion is a new one, but we believe that it is worth repeating that the annual inventory of material and supplies should be more than a count of items on hand and an adjustment of the materials and supplies account. A study of the quantities on hand in relation to the quantities issued during the past year may show some valuable information.

Comparisons may show economical quantities for stock and for purchasing. An overstock of materials means certain loss of return on the money invested while an understock or purchasing in too small quantities may mean not only losses in failing to take advantage of quantity discounts but more important losses on account of work delayed by lack of material.

The proper quantities of material both for stock and for purchase orders are both important and study of them at inventory time is usually time well spent.

Vale 1929, Ave 1930

As the foot traveler pauses at the top of a hill for a moment of rest, looking back over the path which he has been following and then turning to the road ahead of him, we may pause for an instant to look over the past year in the telephone business and then turn our eyes to see what lies ahead.

The year 1929 has been a good year in the telephone business. From a statistical standpoint it has shown a satisfactory gain in telephone stations and of gross and net revenues for the industry as a whole. In the neighborhood of one million stations have been added to the telephone systems of the country and the majority of the larger systems have made a satisfactory financial showing.

In a larger sense, the year has been a good year because of factors which will influence the welfare of the industry in future years. The public has been trained to take greater advantage of the convenience of the telephone as is evidenced by the continued increase in toll line use. The industry has shaken off the burden of commercial sluggishness under which it has labored for several years and has evolved new selling methods and has developed new services that may be sold to the public.

The large volume of orders that have found their way to equipment manufacturers is evidence that the industry is conscious of the futility of trying to give modern service with obsolete apparatus. More and more operating method and commercial practice have been submitted to measurement by the yard stick, "How will this look to the subscriber." The wave of buying properties at inflated prices seems to have come to an end and some of the weaker groups have already passed into stronger hands.

Looking toward 1930, we do not see anything that does not presage another good year. The industry is in splendid condition to meet a moderate recession in business that is forecast by some observers, if the forecasts prove to be correct. It will go ahead along the lines already charted and the end of the year will find it in a healthy, sound condition, ready to go ahead into other years of greater usefulness in the business and social life of the nation and the world.

Federal Communication Commission Hearings

The hearings of the Senate Committee considering Senator Couzens' bill to create a commission on communications and power have up to the time this is being written developed little that is of interest to the telephone industry. Radio and international telegraphic communications have been the principal subjects considered. Many of the witnesses have attempted to show that the creation of a single agency for international telegraphic communication both by radio or by cable is essential to the future of the foreign trade of this country.

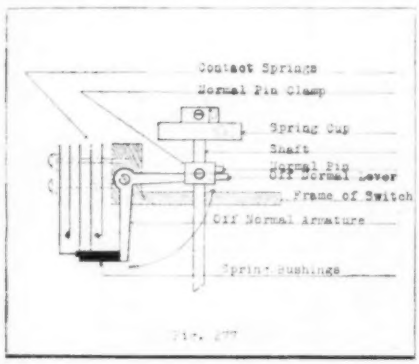
It is reported that Senator Couzens has consented to amend his bill to meet the objections of public service commissions to the assumption of power over local utilities by the federal commission. In general, the telephone industry has been excepted in the suggestions for a super-communication corporation to operate all of the communication systems.

Unless something develops that is not now in sight, it is evident that the future communication commission, if one is established, will have its hands so full of radio matters that it will be able to give little time or attention to telephone matters. If this is the case, it would seem that the regulation of the telephone indusry would best be left in present hands.

Studying Telephone Methods

This is chapter 35 of a series of Articles written by E. R. Collins of the Manitoba Telephone System, Brandon, Manitoba Canada.

There is one small piece of apparatus which should have been included in our study in Chapter 34. This is called the *Off Normal Switch*. It fills a very important place in the completed switch so we will take a look at it before proceeding with the complete circuit arrangement of the connector switch. In the ordinary telephone the hook switch is operated by the weight of the receiver being added or removed to the arm of the hook switch. The movement of this arm is transferred to springs assembled on its



frame. These springs can be arranged in a number of assemblies. The only limiting feature would be that the tension offered by the springs must not be greater than the pressure of the receiver on the arm extension. In the off normal switch we have the same conditions. The springs are tensioned so that they are pressing the off normal armature against the frame of the switch in the direction of the curved arrow in Fig. 277. The off normal armature has an extension arm which projects in under the normal pin of the switch shaft. When the shaft is down in its normal position, its weight holds the off normal arm down, and forces the contact springs out into the position shown in Fig. 277. If the shaft is raised, then the springs will move the off normal armature to the right and change the contact points of the springs. The off normal switch may be made in several forms, but the one shown is the most common type.

Impulsing Circuit

In Fig. 278 we have a circuit with three relays, a release coil, and a vertical and rotary magnet set. There is also an off normal switch. The line or "A" relay has its outer windings connected to a dial of a telephone. This would be connected back through the line switch circuit which is not shown here.

The line relay is double wound with 200 ohms to a side. This supplies battery through a balanced circuit to the telephone. If the receiver at the telephone is removed, the circuit is closed to the line relay, so the armature of "A" operates. Just lay a small button on the drawing over relay "A" to indicate that this relay is now operated. Battery will now flow back through the 800 ohm winding of relay "B" to ground at the armature of relay "A." So lay another button over relay "B" on the drawing, to indicate that "B" is operated.

The armature of "B" operates and closes a circuit from its make contact to springs No. 5 and No. 3 of the off normal switch, through the winding of the 4 ohm "C" relay coil, through the 46 ohm winding of the vertical magnet. But the armature of "B" is still open at the normal contact of relay "A" since A is operated. Relay "B" is supplied with a heavy copper slug, so that it will be slow to release. Now if the dial is operated, "A" which is quick acting, will operate in unison with the impulses from the dial. The armature of "A" releases, and opens the circuit to the coil of "B." But "B" is slow to release, and will not release unless "A" is held open longer than the regular impulse period. So now when "A" releases, it closed a circuit from battery at the vertical magnet, through relay "C" over contacts 3 and 5 of the off normal switch, over make contact of "B" to the normal contact of "A." Remove the button from "A" for a moment.

This battery flow will operate relay "C" and pull up the vertical armature once. This lifts the shaft one step, and releases the link from the double dog, which holds the one step gained. As soon as the shaft has raised one step, it allows the off normal switch to operate its full stroke. This transfers the circuit from relay "B" over contacts 5 and 4 of the off normal, to the armature of relay "C" which is now pulled up, not having released on account of the slow release feature of relay "C", through the winding of relay "C" to the vertical magnet battery. The circuit to the vertical magnet has not been broken by the off normal switch as its contacts 3-4-5, are a set of make before break springs. Therefore "C" becomes saturated during the length of time the dial has the line open for the one impulse. "A" pulls up again, and resaturates the core of "B", and then opens to give the second impulse to the vertical magnet, and in doing so will resaturate "C".

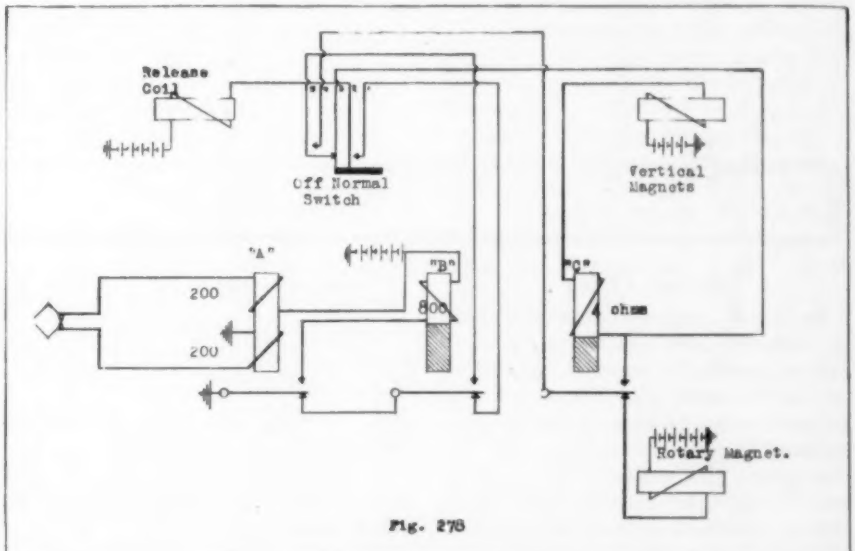


Fig. 278

During the impulse period, relay "B" is energized when the line is closed, while relay "C" will be energized when the line is open. As soon as the first set of impulses is completed, there will be a period of delay while the subscriber is reaching for the next digit. During this delay, relay "C" is de-energized, and must release before the subscriber commences to dial the second digit. The impulses for

the second digit find a circuit from battery at the rotary magnet, the normal contacts of "C" contacts 4 and 5 off normal switch, make contact of "B" to ground at "A". This causes the rotary armature to turn the shaft of the switch to the desired contact of the switch bank.

It will be noticed that there is the resistance of relay "C" in series with the vertical magnet, but the rotary magnet does not have this resistance in series. However, the resistance of "C" is only 4 ohms so as not to impair the pulling power of the vertical magnet. The vertical and rotary magnets are about 50 ohms to the pair. This means that if the circuit to the vertical or rotary magnet were to be closed for long, there would be a current of about 1 ampere flowing which would soon overheat the coils.

operated during impulses, and yet not allow too much current to flow and heat the winding. As "B" is energized all the time the switch is in use it would be overheated if the resistance were too low.

The slow release of "B" would cause a switch to be slow in coming to normal after the subscriber hangs up. The normal time for release of "B" after current is cut off is 0.319 seconds. The normal time for "C" to release after the current is cut off is 0.102 seconds.

If the release time of "C" were increased, then a subscriber calling 55 might get 53 or 52, depending on the number of impulses of the second digit sent before "C" released. The time element of this relay therefore is quite important. It must hold in during impulses, but must release within 0.102 seconds

7. To show a supervisory alarm lamp in case only one party hangs up, leaving the switch resting connected to the called subscribers line.

Vertical Impulsing

As already described the relays "A", "B" and "C" with the off normal switch govern the circuit to the vertical magnets. On account of the heavy current required to operate the vertical magnets, the impulse springs at "A" would be subjected to heavy arcing due to the heavy counter current from the vertical coils, also the series coil "C". To absorb this counter current there is a ½ M. F. condenser shown connected to the armature of "B" (Fig. 279) to ground. In series with this condenser is a small 10 ohm resistance. If we have too large a capacity here the results would be as bad

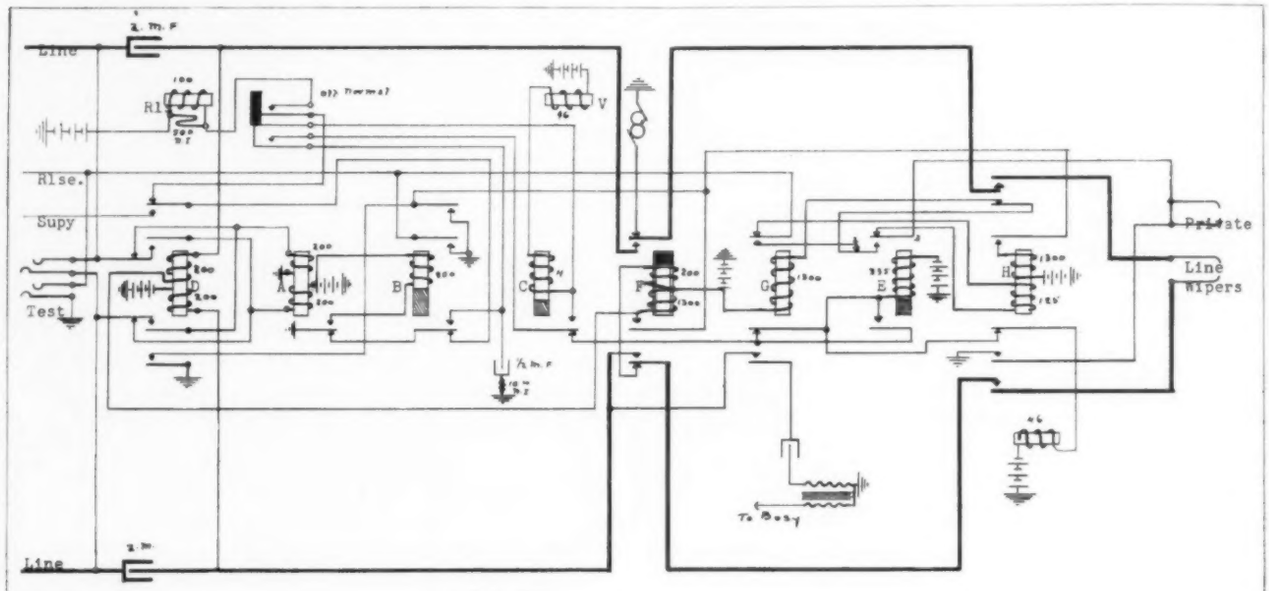


Fig. 279

Release Circuit

Relay "B" remains operated through the time the switch is in use. The off normal switch also remains operated so long as the shaft is up *one impulse step* or more from normal. When the subscriber hangs up his receiver, "A" releases, then "B" releases. Now a circuit may be traced from main battery at the release coil, through contacts 1-2 of the off normal, to the normal contact of "B" and to ground through the normal contact of "A". This causes the release armature to pull up, and drive in the double dog. This releases the shaft which rotates back till the wipers are clear of the bank contacts, and then the shaft drops to normal. When the shaft has reached normal it restores the off normal springs to their normal position as shown in Fig. 278.

The winding of relay "B" is 800 ohms. This resistance is chosen so that "B" will have sufficient saturation to hold it after the impulses of the first digit are completed.

In Fig. 279 we have a complete circuit of a typical connector. The functions of this switch are:

1. To raise and rotate the shaft to the desired contact.

2. To test the desired line for being busy, and send back the busy test to the calling subscriber.

3. To ring the called line if not busy, and send back an inductive tone to the calling subscriber to indicate the condition of the called line.

4. To cut off the ringing current when the called subscriber answers, and place the relays of the switch in a talking position, so that the two subscribers can talk as with a common battery cord circuit.

5. To guard the called and calling line from intrusion during the time the switch is in use.

6. To release the switch after both parties have hung up.

as none at all. If the condenser alone is connected, there will be occasional heavy arcing noticed. If the condenser is allowed to discharge quickly it will set up a heavy arc across the contacts of "A" which will at times weld the two contacts together. The condenser discharge is of a high frequency nature and the small coil in series acts as a choke coil. This delays the time the condenser takes to discharge and prevents a heavy arc. With a ½ M. F. condenser and a 10 ohm coil, for a normal rate of impulsing, there will be very little spark noticed. As the armature of "B" is the common impulse path for both the vertical and rotary impulses, the one condenser and coil will take care of both the vertical and rotary impulse counter currents.

In Fig. 279 there are 8 relays lettered. We will follow the circuit according to the different operations to be performed.

We will assume that the vertical im-

pulses have ceased, and the shaft is up and ready to rotate. Relays "A" and "B" will be operated, and "C" will have dropped back to normal.

Rotary Impulses

The rotary circuit arrangement here is a little different to the circuit shown in Fig. 278. When "C" releases, it opens the circuit to the vertical magnet. It also closes the circuit to the rotary magnet through the normal contact of "G" normal contact of "H" to battery at the rotary magnet. When "A" releases, it operates the rotary magnet. It also closes the circuit for battery from relay "E," causing "E" to operate. This relay is slow release with a holding time of 0.164 seconds after the battery is cut off. Now trace a circuit from battery at relay "G" through the 1300 ohm winding, through normal contact of "H", make contact of the make before break springs of "E" to the private wiper. If the private wiper is grounded then "G" will operate. Suppose the wipers were turning in on a level to the 8th contact, and contacts 3 and 5 were busy. They would be grounded. Therefore when the private wiper is passing these busy contacts "G" pulls up. This would open up the rotary magnet circuit and cause the wipers to stop on the busy contact. But there is a shunt circuit provided. From the rotary magnet follow back through the normal contact of "H" to the armature of "G". Now trace the circuit up to the winding of "E", and down through its make contact, because "E" is now operated, and you will find that the series contact of the rotary circuit at "G" is shunted, so that even if "G" opens its contacts the path to the rotary magnet is not opened. The rotary impulses will therefore drive the wipers to the contact desired regardless of the number of busy contacts passed, but "G" will pull up on each busy contact.

Calling Busy Line

Suppose the line called is busy. Then "G" will pull up when the wiper reaches this contact. Then the impulses cease, and "E" releases. As soon as "E" releases, trace a circuit from the winding of "G" over the normal contacts of "H", to contact 1 of relay "E". Now contacts 1-2-3, of relay "E", will all be in contact for an instant while the armature is releasing, so that a circuit is provided from the normal contact of "H" to contacts 1 and 2 of "E" to the make contacts of "G" which is still operated, to ground at "B". This locks up relay "G" until "B" releases when the subscriber hangs up. Now a circuit can be traced from ground of the busy induction coil make contacts of "G" through one winding of the "D" relay. This busy tone induces through the condenser of this line, a busy tone to the called subscriber. The line wipers are still opened at "H" which has not operated, so that the busy line called does not received the busy tone.

When the calling subscriber hangs up, the release battery flows through the release magnet, off normal switch, normal contact of "D" normal contact of "B" and normal contact of "A" to ground. This releases the switch. If the called line is busy, with this switch, the calling subscriber must hang up his receiver and call again. Otherwise he would receive the busy tone as long as he held this switch, whether the called subscriber disconnected or not.

Ringing the Subscriber

Suppose the line called is not busy. Then when the private wipers hit the called line, they will receive negative battery from the B. C. O. of the called line. This time "G" remains normal. Then when "E" restores after the rotary impulses have ceased, a circuit can be traced from negative battery at the called line B. C. O. coil, over private bank contact, private wiper of connector, normal contact of "E" relay, to 125 ohm winding of relay "H", back to the normal contact of "G", to ground at "B". Now springs 1 and 2 are adjusted so that they will make contact before they cause the other springs of the assembly to move. Therefore when the B. C. O. battery flows through the 125 ohm winding it causes springs 1-2 to close, but there is not sufficient energy to cause the armature of "H" to complete its stroke. But contacts 1 and 2 close a circuit from battery through the 1300 ohm winding of "H" over its make contacts 1 and 2 to ground at "B". This allows the 1300 ohm coil pulling in the same direction as the 125 ohm coil to operate the armature of "H" its full stroke. "H" operates and connects the line wipers to relay "F" over the heavy lines as shown in Fig. 279. It also places an auxiliary ground on the private wiper at "H". Relay "H" also opens the circuit to the rotary magnet to prevent any further impulses driving the wipers off the called line contact.

Relay "H" also opens up the circuit to relay "G" to prevent the busy test from being put on the line.

Ringing current now comes from the generator, over normal contact of relay "F", make contact of "H", line wiper, through telephone bell and condenser, over line wiper, through lower make contacts of "H", normal contact of "F", 200 ohm winding of "F" to negative battery. The relay "F" is supplied with a slow pull up slug, as well as a copper sleeve over the core. This cuts down the impedance to the ringing current, and prevents the relay "F" from operating with the ringing current. When the alternating current is flowing in the 200 ohm winding, it induces a current in the 1300 ohm winding, which flows back through the positive winding of "D" and is induced back to the calling subscriber through the condensers. This gives the calling subscriber a tone to tell that the called telephone is ringing.

Talking Position

When the called subscriber removes his receiver from the hook, battery from the 200 ohm winding of relay "F" flows out through the telephone and back to ground at generator. This causes the 200 ohm winding of "F" to energize. Now the "F" relay has a pair of springs similar to the "H" relay. They close before the rest of the spring assembly moves. Therefore when springs 1 and 2 of relay "F" close, they close a circuit for battery through the 1300 ohm winding of relay "F", back to ground at "B". This allows the 1300 ohm winding to assist the 200 ohm winding to drive the armature of "F" its full stroke.

Up to this time relay "D" had been placing negative battery through both its windings. The lower winding of "D" received negative battery normally, while the upper winding received negative battery from the 1300 ohm winding of relay "F". When "F" operated, then the upper winding of relay "D" is also grounded at relay "B". When relay "F" cuts in, it closes the talking circuit as shown by the heavy lines through to the called subscriber's telephone. This causes "D" to operate. When "D" operates, it reverses the battery supplied to the coils of "A". As shown in Fig. 279, the upper line is positive and the lower line negative. When "D" operates it makes the upper negative and the lower positive. This reversing feature is used for features such as collect and refund for automatic pay stations, supervision on manual circuits. Relay "F" cuts the generator away and opens up its 200 ohm winding. The called subscriber now has a balanced battery feed from the two equal 200 ohm windings of relay "D".

When the subscribers are talking the called subscriber receives battery through the balanced "A" relay windings. The called subscriber receives battery through the balanced windings of the "D" relay. The talking circuit is connected through the two 2 M. F. condensers. The similarity to the impedance coupled cord circuit can be seen, with the talking circuit free of all taps or resistances to lower transmission efficiency.

Release Supervision

If the calling subscriber hangs up first the "A" and "B" relays will release. This would normally release the switch. But in this case the "D" relay is still operated. This opens the circuit to the release coil and prevents the switch from releasing.

The 1300 ohm winding of the "H" relay finds a circuit to ground at the lower make contact of "D" which is

(Continued on page 40.)

Aerial Cable Construction

In This Article Cable Terminals Are Discussed. Proper Placing of Terminals on Poles Is Mentioned, While Splicing Cable Is Also Covered. Written by Ray Blain

When the guys are all placed, messenger strung and pulled, and the cable pulled in we may consider that the most difficult if not the most important part of the aerial cable job as complete. There still remains that all important work of mounting cable terminals, stepping poles and the bonding of the messenger if this type construction is used. Then perhaps the most important of all "cable splicing," which will be considered in a separate paper later.

Selection of Cable Terminals

Opinions differ greatly among telephone engineers and construction men as to the best type of cable terminal to use. Personally I feel sure that all terminals now on the market can be considered as good and differ only in that some are better adapted to extreme climatic conditions than are others. In some extreme damp climates the porcelain blocks will sweat and collect moisture which makes their use unsatisfactory due to leakage. Under these conditions the impregnated wood block is more to be desired. It may be stated, however, that either the porcelain or the wood terminal block is suitable for use in practically every part of the United States. In certain tropical countries the wood block is a necessity.

Some prefer a protected terminal while others don't. Ordinarily along a cable run in a residential district drop wires will consist of short twisted pair loops, and protection where the lines enter the cable will not be required. Under these conditions if protected terminals are used they will tend to cause more trouble than they prevent. On an end terminal where long subscribers' loops or rural lines enter the cable they will require protection which can be provided by connecting them through a small protector mounted independent of the regular cable terminal. This arrangement in addition to being cheaper is I believe better than the all protected terminal.

If a terminal is to be mounted below the messenger the cable stub should be connected to it at the top and if mounted above the messenger the stub should be at the bottom. This arrangement prevents a sharp bend in the cable, which makes it more susceptible to mechanical injury and lightning trouble. The general approved practice is to mount the cable terminal of the flat iron box type with its top 24 inches below the messenger. The can top type terminal of the 10, 15 and 25 pair sizes are generally mounted with the casting at the bottom of the can cover mounted 24 inches below the messenger. There are several conflicting ideas as to the proper side of the pole on which the cable terminal should be mounted. Some prefer the plan of having all terminals face the office with the run of the cable. Lately many companies have mounted all intermediate terminals on one side of the pole and the end terminal facing the office. Then others mount the terminal so that it's on the right hand side of the pole when looking toward the pole from the cable side. Some cable splicers claim this makes their work come right handed and more convenient. It is believed that any plan is satisfactory providing all terminals in a particular exchange are all placed uniform. If the terminals are not mounted in a uniform manner troublemen are likely to have difficulty in locating pairs.

Splicer working right-handed

Stepping Terminal Poles

Terminal or any other poles climbed frequently should be stepped as climbing with spurs will soon ruin the outer surface and hasten decay on the inside. Linemen should be forbidden to wear hooks while working on a stepped pole, but steps should be placed so that a man can reach all his work easily. Steps are generally placed in line with the lead except those located below the terminal to stand on while testing. Iron steps should never be placed closer to the ground level than six feet. Two iron steps should be placed directly opposite each other at this point so that a lineman can grasp one in each hand to help climb the wood or butt steps. Some prefer the use of one wood step which is located three feet from the ground and an equal distance from the first iron steps. This requires the linemen to take two very long steps but also prevents children from climbing poles easily and perhaps falling and injuring themselves. A plan generally considered better is to make use of three wood steps located two feet apart. The first iron step placed above the two placed directly opposite each other should be 18 inches from them. This makes it easier for the lineman to climb from the wood steps and get started on the iron ones. Other steps should then be placed three feet apart on each side of the pole so as to make an 18 inch step for the lineman all the way up the pole. One step should be placed above the terminal just high enough to clear the lid and to prevent lineman from using the terminal for a step. One step should also be placed just above the messenger.

If a joint pole line is being used it is best to extend steps to the lower crossarm. Two steps should be placed a proper distance below the terminal to permit a man to stand comfortably with a belt and safety for long periods of testing. Iron steps should extend from the pole 5½ to 6 inches so that there will be no danger of linemen's feet hanging in them.

Tying Up Splices

It was for many years common practice to tie up all spices with marlin house line. This was satisfactory except for the fact that it must be renewed at regular periods of every few years. At the present time various good methods are being used with about equal success. One is to make use of a piece of cable sheath about two inches wide which is wrapped around the cable and the messenger and bound with several wraps of No. 14 gauge iron wire. Many prefer to use No. 16, tinned annealed copper wire to make the regular splice tie directly on the dead sheath. I have found that ordinary No. 17 copper-weld single drop wire is entirely satisfactory if used to make the ordinary marlin tie. It has all the advantages of the marlin house

line without its disadvantages, for it will last for years without renewing, probably for the natural life of the cable. Many prefer to make a tie at both ends of the sleeve but ordinarily a tie made directly in the center will be satisfactory.

Bonding Aerial Cable

Most construction men claim that cable must be bonded to the messenger at frequent intervals to prevent lightning from passing between the messenger and the cable and injuring the lead by the arcing at the rings. It is true that these burns have appeared at most every ring for a distance of several spans, but I wager that on all such cases you will find that the messenger and cable are grounded. Personally I do not approve

Unprotected cable terminal with external protector box on back of pole

of the practice of grounding messenger but I believe in insulating it from the ground as much as possible.

I am advised by a Bell engineer that his company grounds the sheath of aerial cable only where it is necessary to have it form a part of an electrical drainage system to correct electrolytic action of underground cable or to reduce inductive noises in the aerial cable itself.

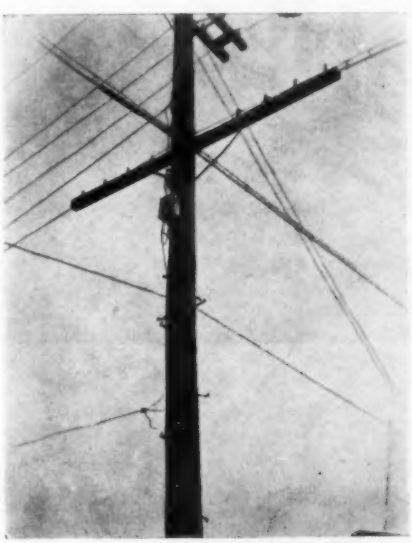
But if you must bond cable do a good job of it and make a good electrical connection between it and the messenger at least each ten poles. Any good electrical contact will answer the purpose of a bond but they must be made so as to stay in service and not cause trouble. An approved plan is to use a lead strap about one inch wide, one end is fastened to the messenger with a three bolt clamp and the other wiped to the cable with metal. This strap must have enough slack in it to absorb vibration and allow a slight shift in the cable if necessary. The lead strap can of course be soldered to the cable, but if this is not properly done the sheath will be damaged and an expensive case of trouble will result.

Back in 1924 I published an article in TELEPHONE ENGINEER on the subject of grounding telephone cables and advocated that the sheath be insulated from the ground on all aerial cables. As an example I cited the record of a certain exchange having over 45,000 feet of aerial cable in service which was insulated from the ground by having the down guys and the messenger separated on the poles, strain insulators cut in on all down guys and insulated splices in all underground dips. During a period of over six years the following cable faults were experienced on the system and it is situated in a district where electrical storms are severe.

Bullet holes	2
Holes caused by lineman's spurs	3
Defective cable terminals	2
Terminal damaged by lightning	2
Cable rubbing guy at corner	1

It will be noted that five of the above faults can be considered as accidental trouble and not due to any material or design of the plant. I might add that all of the large number of terminals in this exchange are of the unprotected type.

This system is still giving good service and they would not care to consider either the installation of protected terminals or ground connections to the cable sheath. The secret of less trouble on this type of construction it is believed is due to the fact that when a high potential enters a cable where the sheath is grounded there is every probability that it will find a weak place in the insulation and break down to ground on the lead covering and serious trouble will be the result. On the other hand if the sheath is insulated the chance will be much greater that the potential will be carried through the cable to the protectors where it will be taken care of without damage.



Terminal mounted below messenger, showing correct position of pole steps

Another real advantage of the insulated messenger and cable is that should it come in contact with a wire carrying a high voltage there is every chance that no damage will be done. But if a grounded cable comes in contact with such a wire or a trolley, look out, for there will be a rush call for the cable crew and fireworks.

It is not believed possible for the voltage induced on an insulated cable by a nearby lightning flash to cause even minor trouble by the passing of this current from messenger to cable. It seems certain that this voltage would leak off through the poles without injury of any kind to the cable.

We believe there is too much of a tendency in the telephone world to follow an approved practice which obstructs progress. It has been said that we must run like the devil all the time to stand still. It seems that we must either go forward or backward, that nothing ever stands still, especially in the telephone business.

Some say that insulating cable from the ground is not standard practice just as some people did when the farmer boy in years gone by threw away the millstone and placed half of the corn in each end of the sack as the standard practice at that time was to place all the corn in one end and a rock of equal weight in the other so that it would balance across the horse's back. Everyone has troubles enough in the telephone game without the use of any millstones.

CONVENTION SCHEDULE.

Minnesota Telephone Association, Radisson Hotel, Minneapolis, January 28, 29, 30.

Nebraska Telephone Association, Omaha, Hotel Paxton, February 11, 12, 13.

Oklahoma Utilities Association, Tulsa, Mayo Hotel, March 11, 12, 13.

Texas Independent Telephone Association, Fort Worth, Texas Hotel, March 18-21.

Iowa Independent Telephone Association, Des Moines, Hotel Fort Des Moines, April 8, 9, 10.

Pennsylvania State Telephone & Traffic Association, Penn-Harris Hotel, Harrisburg, May 12, 14 and 15.

Up-State Telephone Association of New York, Rochester, May 21, 22 and 23.

Surveys Improvements

The Bruceton Telephone Co. (Tennessee), with C. W. Fulghum, owner and manager, is having a preliminary survey of Bruceton made by D. B. Carmen, Kellogg Switchboard and Supply Co., of Chicago. This company has been employed to take down all the old cables and to put in new cables and extend the lines wherever necessary.

THE Stromberg-Carlson Desk Stand, for years th leader among standard telephone instruments, has a equally dependable companion, the Stromberg-Carlso Hand Set. High transmission and reception efficiency dis tinguish both of these telephones.

Maintenance cost for the Stromberg-Carlson Hand Set is a negligible as for the Desk Stand because of the carefull selected materials, practical design and accurate construc tion employed throughout its manufacture.

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Stromberg-Carlson Hand Sets are preferred in offices and homes. They fit the modern decorative scheme far better than other types of telephones. They are light, well-balanced and require the use of only one hand.

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The History of the Wave Filters

History of the Discovery of the Electrical Filter and Its Importance to the Telephone Industry Is Rehearsed by Mr. F. J. Dommerque, Fellow A. I. E. E. in His Interesting Way

Historical Events

At the commencement of the world's war, or shortly thereafter, two scientific men made the discovery of the electrical filter practically simultaneously but independent of each other. The one was Dr. G. A. Campbell in America; the other one was Dr. K. W. Wagner in Europe. As the discovery was made in wartime, such an important invention could not become known generally; in consequence the general public did not realize this important event until the war was over. Who of the two inventors deserves the credit of priority has never been decided, which, however, matters little; there is glory enough in the invention for both.

As a physical necessity, both attained the same goal by following the same method of reasoning. Both established their theory upon the differential equations of the transmission line; only the form in which they wrote down their theory differs. It is not our intention to go into this theory, as differential equations are not at every man's finger tips. We will attempt to give a fair picture of the filter in a non-mathematical way.

Years before the war a number of investigators had worked on producing a method of multiplex telephony; in this country General Squier succeeded to operate experimentally a carrier current system over a short telephone cable circuit in 1910. The difficulty arose that for practical exploitation the separation of the various carrier channels necessarily had to be very wide, else distortion of speech would set in. This difficulty was finally overcome by the invention of the "filter," which permitted of a closer proximity of the carrier frequency channels to each other. The first operative multiplex telephone installation was placed in service between Baltimore and Pittsburgh during the world war.

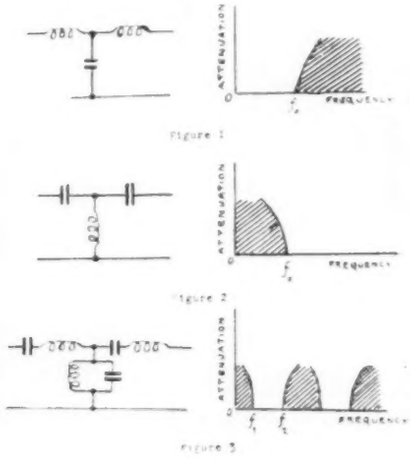
The next great event in the history of telephony was the application of the electronic tube as a repeater. The wave filter had to come to the aid of the repeater to make two-way operation successful.

Aside from services given to radio engineering by the filter, the period from the above mentioned events to date has witnessed a continuous effort to improve transmission and free it from distortion and kindred evils. In this development work the filter has done its share and will do more so in the future.

Elementary Theory of the Wave Filter

At the bottom of the theory lie two phenomena well known to the telephone practician practically since the beginning of the art of telephony, namely, first that an inductance coil, or retardation coil as it has also been called in telephony, will impede or stop the voice currents from passing, and second, that a condenser will transmit voice currents. We may express these facts in another way, namely, an inductance coil permits currents of a low frequency to pass more easily than currents of higher frequency, while a condenser permits currents of a high frequency to pass more easily than currents of a lower frequency. These circumstances will thus provide means of arranging inductance coils and condensers in such a manner that they form a "filter," which may be defined as a network, consisting of one or more sections, each one composed of inductances and capacities, the cumulation of the attenuation effects of the individual sections giving the desired discrimination against the frequencies in question.

No resistances are included in the above definition because they in themselves have no filtering action. They exert, however, an influence upon the sharpness of the filter; the lower the resistance in any filter the sharper will be the division between the frequencies passed and the frequencies blocked. It may be mentioned here that this sharpness of the division line is still more accentuated by the number of sections in the filter; the more sections the sharper the division line.



The best known types of filters are the "band-pass" filter, the "low-pass" filter and the "high-pass" filter. A band-pass filter passes, as its name implies, a range or band of frequencies between two limits, an upper and a lower limit, but attenuates or blocks all the others. The low-pass filter is a special case of a band-pass filter in which the lower limit is set at zero. Also the high-pass filter is in reality a band filter having its upper limit at infinity.

In Fig. 1 to the left the network of a low-pass filter is shown. The inductance coils are placed in series and the condenser in derivation or shunt. The picture to the right illustrates the action of such a filter. There is the white portion wherein the low frequency currents are passed, and the shaded portion, wherein

FRANZ J. DOMMERQUE
606 Sixth Street
Lakewood, New Jersey

December 25, 1929.

Mr. J. A. Smith, President,
Telephone Engineer Pub. Co.,
Chicago, Ill.

My Dear Mr. Smith:—

Thank you for your kind letter of appreciation and the good wishes which are heartily reciprocated. I wish to assure you that the Telephone Engineer is a source of happiness to me for a number of reasons: First, it keeps me in touch with the men and conditions in the West, my old stamping ground; second, it gives me pleasure to know that my contributions are doing some good to somebody, although they can not compare in originality and details, such as are of great help to the practical telephone man, with the articles given us by Mr. Collins; third, there is no greater enjoyment for me in these days than to pass my time in writing of the engineering problems of the telephone fraternity, of which I was a member so many years.

Wishing good to yourself, to your paper, to its readers and collaborators, I remain, yours sincerely,

F. J. DOMMERQUE.

the higher frequencies are attenuated or stopped. In the white region the low frequency currents find an easy path through the inductances, but an obstacle in the shunting condenser, while in the shaded region the high frequency currents find a high impedance in the inductances and only low impedance in the condenser. It may be noted that continuous currents can be considered as having zero frequency.

In Fig. 2 a high-pass filter is shown

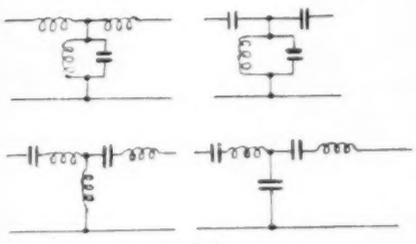
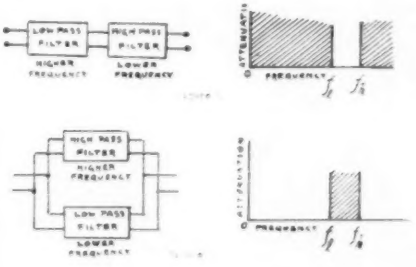


Figure 4

to the left. The diagram to the right shows its action. This filter has its condensers connected in series and its inductance coil in shunt, therefore their positions are reversed from the positions in Fig. 1 and their actions also.

The band-pass filter, in its most general form, is illustrated in Fig. 3, to the left its network and to the right its action. The illustration does not require any further explanation; it tells its own story.



In Fig. 4 four more kinds of band-pass filters are given, which are only different or rather simpler forms, obtained by leaving out one or more of the inductance coils or condensers. These kinds are distinguished from the general kind shown in Fig. 3 in that their band of frequencies is narrower, which may be desirable in some cases. Where a wide band with sharply defined limits is desired, the band-pass filter shown in Fig. 3 is preferable. There are numerous filters; we have only reproduced the most common ones.

All filters have a cut-off frequency, which occurs at the division point between the two regions. Loaded telephone lines are of the same character, as the filter shown in Fig. 1, the loading coils being connected in series, while the leakage is represented by the condenser. They also have a cut-off frequency; it occurs where the attenuation approaches infinity.

In the action-diagrams of Figs. 1, 2 and 3 the ordinates are marked "attenuation" and the abscissae "f," where "f" designates the frequency; therefore the point "f_∞," where "f_∞" designates the cut-off frequency, is the point where the attenuation commences to grow abruptly and steeply in the case of the filter having its inductance coils in series as shown in Fig. 1, and the point where the attenuation changes from its steep descent to a practically negligible value, as shown in Fig. 2.

In the action-diagram of Fig. 3 the point marked "f_1" designates the lower limit and the point marked "f_2" the upper limit of the band.

High and Low Pass Filter Combination

A high pass filter may be combined with a low pass filter in two ways; they may be connected together in series or in parallel. When connected in series as indicated in Fig. 5, they will pass currents between the cut-off frequencies of the two filters, which are designated as f_1 for the low pass filter and f_h for the high pass filter. It is necessary, however, that the cut-off frequency f_1 is *higher* than the frequency f_h. To the right of Fig. 5 is shown the action-diagram of this combination. In the white portion between the points "f_1" and "f_h" the currents of frequencies between f_1 and f_h can pass; in the shaded sections the currents having a frequency below f_1 and f_h are blocked.

When the two filters are connected in parallel, as shown in Fig. 6, the currents of frequencies above the cut-off point of the high pass filter and the currents of frequencies below the cut-off points of the low pass filter will pass, while the currents of frequencies between "f_1" and "f_h" will be blocked.

Parallel Resonance

When speaking of resonance, usually "series" resonance is thought of, that is,

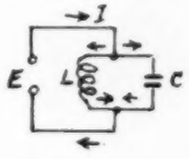


Figure 7

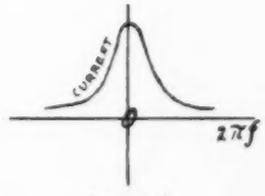


Figure 8

resonance in an alternating current circuit containing resistance, inductance and capacity in series. Resonance is obtained when the positive reactance of the inductance is equal in value and is opposite to the negative reactance of the condenser; then the impedance will be a maximum.

We have also a "parallel" resonance. If in the circuit shown in Fig. 7 an e.m.f. having a definite frequency is applied, the current in the main circuit will divide, when arriving at the point A, where an inductance coil and a condenser are connected in parallel. The inductance and capacity in this parallel circuit can be so adjusted that the applied e.m.f. is prevented from causing current to flow in the circuit. Such a combination, therefore, acts as a filter, as only one frequency is blocked; the others, however, can pass. To filter out a current having

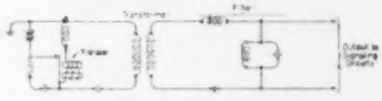


Fig. 9 135-Cycle Interrupter Circuit

the frequency f, the following relation between inductance and capacity must be brought about:

$$C = \frac{L}{R^2 + (2\pi fL)^2}$$

where C is the capacity of the condenser, L the inductance of the coil, and R the resistance of the circuit. Thus, when the capacity C is varied until resonance is obtained, the absolute value of the impedance of the combination of inductance and condenser will have reached its maximum.

In Fig. 8 the so-called "Resonance Curve" is illustrated, which shows the relation between current and frequency.

Anti-Noise Filters

To prevent interference with conversations by battery charging machines it has been customary to build special motor-generators with a great number of commutator segments. In late years since the filters came into use, the ordinary commercial type of generators has been employed for charging in place of the expensive special machines. They have been made quiet by the aid of filters to such an extent that they may be used to float the battery. Special inductance coils and condensers have been developed for that purpose. The coils are of the enclosed shell type and the condensers are electrolytic condensers of high capacity. These condensers are also very effective in reducing cross-talk on talking feeders to a very low point.

Not only in connection with charging machines but also on signaling apparatus used with the 135 cycle equipment on long toll and radio signaling circuits filters have done good service to prevent interference. Such a filter is shown in Fig. 9 inserted in a 135 cycle interrupter circuit.

Pitch-Treated Lodgepole Pine Poles Give Short Life

Result of Experiments Conducted by Members of Forest Service, U. S. Department of Agriculture. This Treatise Is Based on 16 Years' Testing. Written by R. M. Wirka[1] and C. N. Whitney[2]

An experiment was begun by the Forest Service in 1913 to determine the suitability for poles of pitch-treated lodgepole pine trees. A total of 132 lodgepole pine trees, suitable for small poles, growing in an area on the Beaverhead National Forest near Melrose, Mont., were selected. The bark, with the exception of a vertical strip about 2 inches wide to sustain growth, was removed from each tree to a height of about 5 feet above the ground[3]. A high resin content was thus produced in the butts of the living trees since the barking caused a heavy flow of resin in the peeled areas. Views of the peeled trees are shown in Figures 1, 2 and 3.

Fig. 1—Lodgepole pine trees stripped of bark to a height of 5 feet to cause the flow of resin.

Cost of Treatment

The cost of this method of treating trees is not high. Peeling each tree in 1913, using Forest Service labor, cost 15 cents. This cost would be higher at present but even if it were double, which is probably a very liberal increase, only 30 cents would be invested. Interest must be charged against this cost during the time the trees are allowed to stand but even on this basis the total would be about 48 cents for a 30-cent investment for eight years at 6 per cent, compounded annually. Other charges against this type of treatment are loss of any trees on the stump due to fire, breakage, or death from other causes.

Examination of the Trees

The trees were examined in 1921, eight years after peeling, and it was found that one had died and three had broken at points where they had previously been chipped to determine the resin content. Of the others, 30 had a one-eighth-inch coating of pitch over the entire peeled surface, 70 had a coating of resin over the peeled area for distances of from 18 to 28 inches down from the top, and the remainder had a very light coating which in a few instances did not extend around the peeled area. The trees were cut in May, 1921, at which time they were heavily impregnated with pitch in the peeled areas to a depth of about 1½ inches. All trees appeared to contain about the same amount of pitch. The growth of the trees during the eight-year period between 1913 and 1921 caused the formation of a ridge of wood under the 2-inch strip of bark. An examination of this ridge on each pole indicated a low pitch content, probably about the same as the wood above the peeled area.

The Pole Line

Seventy-one of these poles were used in June, 1921, for a single-wire Forest Service telephone line about 3 miles long near Melrose, Mont. Most of the poles were cut to a 22-foot length, although a few longer ones were used at road and telephone crossings. All bark, including the vertical 2-inch strip at the butt, was removed from each pole before setting. About a month elapsed between the time the trees were cut and the time the poles were set. Most of the poles were set to a depth of from 2½ to 3½ feet, and with all of them care was taken to have at least 3 inches of the pitched area above the ground. The shallow setting of some poles was due to a solid rock formation that was encountered. The cost of blasting precluded setting the poles deeper.

Thirty poles were set in black loam soil that is quite wet during the summer months from the irrigation of adjacent fields; 29 were set in very rocky black loam soil on a dry north slope; and 12 were set in the river bottom sand and gravel, which is fairly dry.

An examination of some of these poles was made in September, 1928, about seven and one-fourth years from the time of setting. A total of 15 poles were carefully examined by removing the soil around the pole for a depth of about 1 foot. The poles selected for inspection were believed to be representative of the various conditions of service prevailing in the line. Their condition is shown in Table 1.

Fig. 2—A lodgepole pine tree stripped of bark with the exception of one narrow strip to sustain growth.

It may be observed that none of the poles examined were free from decay in the butts, and about 40 per cent were so badly decayed as to warrant removal.

The tops of the poles were observed but no decay was detected. It is believed that the condition of the 15 poles examined is, in general, representative of

[1]Associate Engineer, Forest Products Laboratory, Madison, Wis.
[2]Office of Forest Products, Missoula, Mont.
[3]A patent (No. 655,638) covering this method of treating trees to be used for fence posts was issued to J. G. Robinson of Brooklyn, Ala., on Aug. 7, 1900.

the condition of the other poles which were still in line in 1928.

Prior to 1928, 12 poles had been removed on account of decay in the butts. Assuming that 40 per cent (see Table 1) of all the poles still in line in 1928 were so badly decayed as to warrant removal and including the 12 poles removed prior to 1928, it is estimated that about 36 or about 51 per cent of the total of 71 poles originally set have already been removed or are so badly decayed at the butts as to warrant removal.

Table 1.—Condition of 15 Pitch-Treated Poles Near Melrose, Montana, Examined in September, 1928

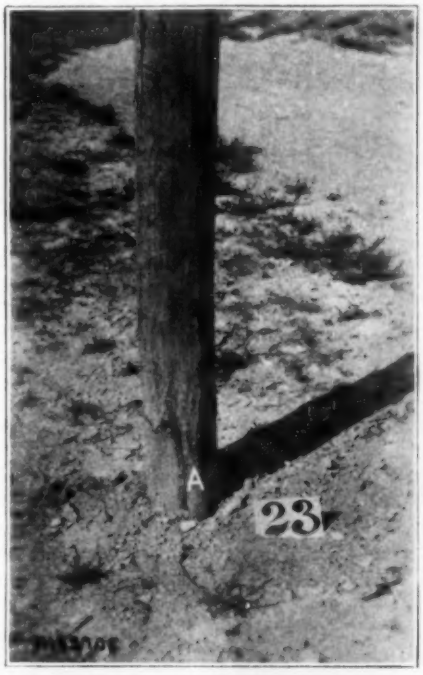
Number of poles examined	CONDITION							
	Good		Partly decayed at butt		Badly decayed at butt		Sufficiently decayed at butt to warrant removal	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
15	....	....	4	26.7	5	33.3	6	40.0

Conclusions

It is estimated that lodgepole pine poles, which have been treated by barking the living trees, will give an average life in the Montana region of about eight years. Untreated lodgepole pine poles in the same region would probably give an average life of about seven years. This short increase in life may be enough to pay for the cost of treating the poles; however, thoroughly butt-creosoted lodgepole poles treated by the open-tank method when used under similar service conditions would give a very much longer life and would prove more economical. There seems, therefore, to be little to recommend in the pitch treatment.

Fig. 3—Resin on the stripped surface of a lodgepole pine tree. The strip of bark left to sustain growth is on the opposite side of the tree.

The principal weakness of this pitch method of increasing the life of poles is the ridge of untreated wood that grows under the strip of bark left to sustain growth in the tree. All the poles examined in 1928 were attacked by fungi at this untreated ridge, although a few showed decay in the peeled surfaces indicating that that area also was not always well protected. The ridge might be protected with several coats of creosote applied either by brushing or spraying. It is doubtful, however, that poles given such a combination treatment would give a longer life than ordinary poles having a brush or spray treatment of creosote over the entire butt.



Fib. 4—Appearance of pitch-treated pole in service. The ridge of untreated wood is on the near side of the pole at "A."

Brevits

N. C., Durham—Interstate Telephone & Telegraph Co. started erecting 3-story telephone building addition, Holloway St.: $27,000.

Tenn., Englewood—David Ball, Bristol, acquired Inter-County Telephone Co.

California, Here We Come ($)

Expenditure of between $500,000 and $1,000,000 in the San Bernardino territory next year in extension of telephone facilities to improve service is included in the budget of the Associated Telephone Co., operating telephone systems in a number of southern California cities, according to C. F. Mason, vice-president.

Fig. 5—Pitch-treated lodgepole pine pole rotted off after about seven and one-fourth years' service.

Teletype Installation

Installation of a telephone typewriter system for the Metropolitan Police Department (Washington, D. C.) consisting of 18 sending and receiving sets, located at police headquarters in the District building, and at the precincts and other special service points throughout the district, is included in part of an appropriation of $333,010 authorized for additions and betterments to the telephone system in Washington by the board of directors of the Chesapeake and Potomac Telephone Co. This brings the total amount authorized for similar work here this year to $2,808,475.

The telephone typewriting system will supplement the present private branch exchange telephone system now maintained for the Police Department, but it will in no wise replace the telephones. The advantage of the telephone typewriter is that simultaneous typed messages may be sent to each of the precincts and special points where these installations are made. Also messages may be sent from any of the stations to police headquarters in the District building.

Teletype Corporation of Chicago, Ill., furnished machines for this service.

Pays Annual Dividend

Meeting in the Central Trust & Savings bank, the board of directors of the Geneseo Cooperative Telephone Company (Illinois) voted to pay an 8 per cent dividend as of Dec. 31, 1929.

Last year the company authorized a 6 per cent dividend. At that time the 8 per cent dividend was predicted for this year by Manager Robert L. Parker. The company has experienced a profitable year.

Reliable Electric Company Celebrates 20th Birthday

Let us then, be up and doing,
With a heart for any Fate,
Still achieving, still pursuing,
Learn to Labor and to Wait.
—Longfellow.

Wallace L. Cook, Pres.-Gen. Mgr.

Since 1909, Reliable Electric Company, 3145 Carroll Avenue, Chicago, has been looking forward to the completion of its first score of years in the serving of the telephone industry. Achievement in good will, good business, and good friends have rewarded them. Here's a wish for another twenty years with the same success!

Since organization, the company has steadily grown until they have had to enlarge their quarters several times. Their manufacturing plant is second to none in their line and for their requirements. Officials of many years' experience have been the guiding genius, and on their 20th anniversary the telephone industry extends their congratulations.

Starting in 1909, their factory for the manufacturing of telephone protective equipment was located on South Jefferson street, Chicago. Good business plus good management made it necessary for them to search for larger quarters and in 1913 another move was made. The old timers in the business remember very well the steady growth of the company from its earliest small factory to its up-to-date, modern plant now housing them. Their move in 1913 was only temporary, events show, as by this time their toehold had increased to a foothold and they were firmly entrenched with the industry they have served so loyally and well. Again larger quarters were needed.

Purchasing close in property to downtown Chicago, the officials of the company decided to erect their plant for future growth with their chosen industry. This plant, modern to the "nth" degree, was another milestone in the history of this growing concern. Nineteen hundred and twenty was indeed a proud moment in the lives of the veterans in charge of the company. And again they were faced with business that increased so steadily with the industry that in 1928 another section had to be erected to care for them. The officials, as well as the telephone fraternity, can well be proud of the ever-increasing value of this company to the indutry.

Geo. W. Rodormer, Sec.-Sales Mgr.

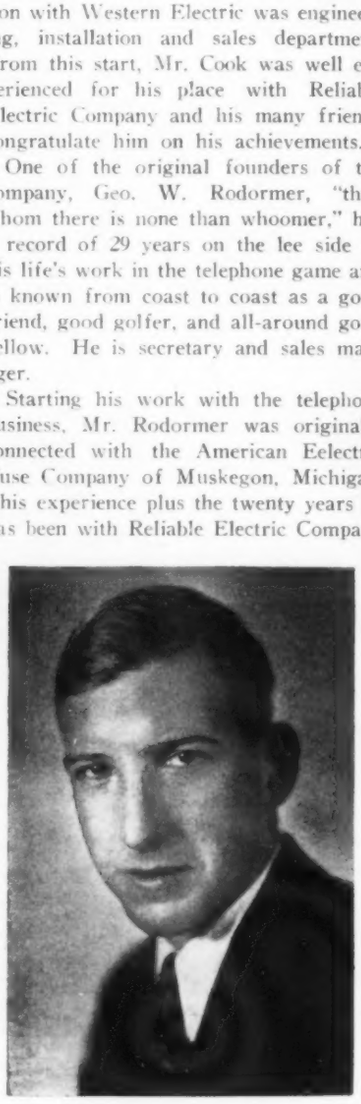
With 27 years in the telephone business behind him, Mr. Wallace Cook, president and general manager of the company, is indeed a pioneer. Of these 17 years he has been with Reliable Electric Company. He is a director of the United States Independent Telephone Association. His entry in the telephone business was in the early "1900's" and he has well kept pace with the rapidly growing telephone industry to, which he has pledged his life work. His start was in the engineering department of the American Electric Company.

E. Winston Rodormer

From this concern he went with the Western Electric Company as engineer of their house in St. Louis. His connection with Western Electric was engineering, installation and sales department. From this start, Mr. Cook was well experienced for his place with Reliable Electric Company and his many friends congratulate him on his achievements.

One of the original founders of the company, Geo. W. Rodormer, "than whom there is none than whoomer," has a record of 29 years on the lee side of his life's work in the telephone game and is known from coast to coast as a good friend, good golfer, and all-around good fellow. He is secretary and sales manager.

Starting his work with the telephone business, Mr. Rodormer was originally connected with the American Eelectric Fuse Company of Muskegon, Michigan. This experience plus the twenty years he has been with Reliable Electric Company



John Brown Cook

has caused him to be known all over the country, as he has traveled extensively for his company and is about a record-holder as far as attending conventions is concerned. The writer has been an attendant of many of these meetings and well remembers the many associations Mr. Rodormer has made representing his company. He is a member of the Independent Pioneer Telephone Association and has been since this association first started. He was a member of the committee that made the banquet at the National Association convention such a huge success, which I think ought to merit a paragraph in itself.

New blood, young blood, if you please, has its place in the Reliable Electric Company. Recent members to the firm are E. Winston Rodormer and John B. Cook, both hailing their alma mater as Dartmouth.

The first mentioned, son of Geo. W. Rodormer, finished his educational studies in 1927 and was immediately started on his career by his well-known Dad. Spending a year's field work at once with the help of W. S. Green, general manager of the Middle States Telephone Company, he was located at both Park Ridge and Pekin, Illinois. This on top of his travels recently to conventions and association meetings, and his ground work in the factory, should eventually well qualify him for his chosen work in the sales end. And if you don't think E. Winston Rodormer is a golf player, don't say that we didn't warn you! His many friends all over the country say he's a "chip off the old block," and we look forward to his ultimate success as a representative of the Reliable Electric Company in the future.

The entrance of John B. Cook to the firm was in September of 1929. His interest is mostly in manufacturing and being particularly interested in physics, which was his major course during his university days. Scientific research is his hobby and his addition to the firm will be of much value. This modern example of infusing new and young blood in the industry is to be felt in later years and we predict a future in the work of this new member. The particular business engaged in by the Reliable Electric Company can well use the services of a young man of the ability of John B. Cook and his scientific researches will be of real value.

With the 20th Anniversary of the Reliable Electric Company, we, the publishers of TELEPHONE ENGINEER, wish to congratulate again the service their company has been to the industry as a whole, and know their future is assured as one of the important cogs of the telephone industry.

Kellogg President Dies After Short Illness

William Lawall Jacoby, president of the Kellogg Switchboard & Supply Company of Chicago, passed away at Chicago on January 11, after a short illness. Pleurisy was the cause of his death.

Mr. Jacoby had been president of the Kellogg company since March, 1927.

During his association with the company Mr. Jacoby served both the radio and telephone industries. For two years he was a member of the board of directors of the Radio Manufacturers Association, during which time he was chairman of the Fair Trades Practices Committee. He was for two years on the board of directors of the Electric Association of Chicago.

He was a member of the board of directors of the Independent Telephone Association and had been a member of the executive committee of that body during the years of his connection with the Kellogg company.

He was born December 12, 1873, at Bethlehem, Pa. His father, Cyrus Jacoby, was a druggist of Bethlehem; mother, Mary (Weierbach) Jacoby, both of American-German ancestry.

In 1913 he accepted the vice-presidency of the American District Telegraph Company and 70 other subsidiaries of the Western Union Telegraph Company, then controlled by the American Telephone & Telegraph Company, and soon thereafter was made president of such companies, resigning from those offices September 15, 1918, to accept the invitation to become associated with A. G. Becker & Company, bankers of Chicago, with which company he continued as vice-president until March, 1927.

June 8, 1921, he was elected president of the Mitchell Motors Company of Racine, Wis., to which he devoted the major part of his time until April, 1923, being also director and general manager of several other industrial organizations.

He was a member of the Mid-Day Club of Chicago, University Club, Chicago Golf Club, Press Club of Chicago, Engineers' Club of New York, and also of various associations of commerce.

Thanks to Mr. Rolf Selquist

Our pardons to Mr. Rolf Selquist, Electrical Engineer of the Copperweld Steel Company, for not crediting him for his unusually interesting article entitled "Grounding with Driven Electrodes" reproduced in December TELEPHONE ENGINEER. This dissertation was delivered at the Plant Conference during the National Convention and received much praise. We hope to be able to present another article by Mr. Selquist during the coming year as much favorable comment has been made on the treatise mentioned. Pardon again, Mr. Selquist.

TELEPHUNNIES

Some twenty years ago the first telephone system was constructed in a small town twelve miles distant from a certain main exchange, and the telephone, being something new, was considered more of a novelty than a public servant. Some of the local boys wanted to play a trick on the town barber, and one of them called the barber over the telephone. The trickster disguised his voice and said: "Josh, this is the manager of the telephone company and I want to test your line and telephone. Do you hear we well?"

"Yes, sir," answered Josh, "I hear you fine."

"Alright, Josh. Now just as a preliminary test I would like for you to step back about ten feet and speak toward the telephone and I'll see how well I hear you," said the pseudo manager.

No answer. Finally Josh came back to the telephone.

"Well now, Josh, I didn't hear you."

"Well, to tell you the truth, Mr. Manager, I thought you was one of them dern boys a prankin' me."

"I'm very sorry you feel that way about it because this is really very important, and if I don't have your cooperation I can't make a thorough test at all. Now I wish you would place the receiver under your left arm and see how well you hear me."

"I hear you fine."

"Now place the receiver under your right arm and see how well you can hear."

"O. K."

"Very well, get up in a chair and see how my voice comes in."

"Better than ever."

Now Josh, will you please stick the receiver in your hip pocket and turn a back flip?"

The manager from the main office had to make a special trip to that town the next day to convince Josh that he hadn't instructed him to turn the prescribed flip.—Submitted by Ernest Wommack.

Now you tell one!

Ramblings

RAMBLINGS—J. A. S.

And now they marry by phone. A young lady in Waco, Texas, and a fellow over at Cleveland, Ohio, were married by a parson somewhere on the line during the holidays. The ceremony was quite short, both answering "I do" to the parson's query. And so the "do do's" will doubtless live happily ever after, especially if they remain fifteen hundred miles apart.

* * *

The Christmas spirit brought to us many kind recollections from telephone friends from the Atlantic to the Pacific. We are sometimes told by those we unconsciously call "lukewarm" friends that "we toil not, neither do we spin," meaning probably that we let so many opportunities for saying or doing the right thing at the right time pass, that we are lacking in ambition to do the best possible job. Possibly they are right—confirmation might be found in our own household and is a subject for discussion with new resolutions the first of the year. Being a parliamentarian we always move that such subjects lay over on the table until they are forgotten. But these remembrances from friends puts new life into us and make us feel somebody still believes in us. Whether we have acknowledged receipt of every card or letter, we want you to know we appreciated the line.

* * *

Yes, we are satisfied with the many blessings the season brought us. It is always a ticklish time with the publisher around the first of the year; like the candidate on election day waiting for the returns to come in. Many advertising contracts are up for renewal at this period, and the mail is scanned for news—good or bad—from firms we have been serving, or hope to serve, in the future. And when the letter arrives, we hesitate to open it—hoping for good news, but fearing the opposite. The ordeal is now over, and we are able to resume our natural pose and feel at ease for another year.

* * *

In a small news item in the December issue we mentioned the fact that W. S. Vivian had been made vice-president of the Middle West Utilities Company, in charge of public relations. Thousands of people in the telephone industry know Mr. Vivian personally and rejoice with him that his services have been recognized by this great public utility corporation. He has been with the Middle West Utilities Company for several years in the capacity of public relations director. Vivian will be remembered as secretary of the United States Independent Telephone Association for several years, beginning back in 1913 and ending four or five years later, being succeeded by C. C. Deering. As secretary of the Association he made contacts with many of the state associations and individuals who remember the very efficient work he performed during that period.

* * *

Beginning with January many states in the middle west have announced convention dates for state associations. which indicates the usual interest in the industry for the coming year. Conditions look very encouraging for telephone companies during the coming year; heavy construction programs were laid out in 1929 and much of this work is uncompleted, but the finances have been arranged and there is no indication of slowing down in work.

* * *

W. C. Dillon, who will be remembered by many telephone men in the Southwest ten and twenty years ago, will be interested to know that he is still active in many things that bring his former training into usefulness. Bill is now with the Diebold Safe company at Canton, Ohio, where he is working in the laboratory as an expert in burglary protection. He invented and placed on the market several years ago a burglar alarm for banks which attracted attention at the time. Since then he has been working in radio shops and studying the more complicated systems of protection for banks; some of his demonstrations at Canton have been reported as marvelous by experts. Dillon has been called upon several times recently by civic clubs for luncheon talks and usually comes away with a good newspaper story.

* * *

Ray W. Smith, publisher of Transmitter-Journal down at Fort Worth, Texas, arrived just ahead of the fifteenth-inch snow in Chicago, where he spent the month with his dad, J. A. Smith of Telephone Engineer. About all the snow you see in Texas is what you catch before it hits the warm ground, and the ice one sees is sold at 40 cents per hundred pounds. So you can imagine his feeling when meeting the raw winds from Lake Michigan during the zero weather. "He came, he saw, and he is satisfied—with Texas."

* * *

Friends of Lyman S. Gardner, secretary of the Texas Independent Telephone Association, will regret to learn that his health has been very much impaired the past few months. Gardner attended the convention in Chicago during October but after returning to his home at Waco he has been forced to remain at home most of the time. Gardner has made many friends throughout the country who join us in wishing for him a speedy recovery.

* * *

The Ohio Independent Telephone Association "put over" one of the cleverest publicity stunts on record when its very clever president and board of directors conceived the idea of presenting "Honor Awards" to members showing progressive development during the past year. Upon the occasion of such presentation the newspapers of the city where the presentation takes place make extended mention of the progressive spirit of the home utility, city officials usually take part in the exercises which binds the local utility closer to the public. Ohio Association shows a spirit which might well be followed by other states.

* * *

The Oklahoma-Arkansas Telephone Company, of Poteau, Okla., Fort Smith, Ark., and other places in the Southwest, comes to the front again with its publicity stunt. This time it discards its former buffer—Mendel—and the "man higher up" comes to bat for what the company thinks is just and proper. I. H. Nakdimen, banker, telephone owner and publisher, appeared before the hotel men of Kansas, Missouri and Oklahoma in session at Tulsa recently and severely criticized the Bell Telephone Company for its method of dividing toll commissions with Independent telephone companies, hotels and other sources of revenue for major company. He recited the losing fight his company had made the last few years for a more equitable distribution of tolls—as he saw it—and urged some method be presented which would insure justice to everyone interested.

* * *

Nakdimen suggested that large toll users install time clocks on their telephones or switchboards to give the accurate check of time consumed by calls and to guard against errors that might be made by operators in listing charges. A very good suggestion we believe. If the timing could be made to correspond with the toll call many complaints would doubtless be avoided and a better understanding between the company and customer maintained.

* * *

The Gulf States Telephone company with headquarters at Tyler, Texas, has recently completed the installation of modern equipment at its exchange at Cooper, Texas. R. B. Still, the general manager of this company is continually bettering the service in East Texas, replacing obsolete equipment with more modern plants as fast as the work can be accomplished. The Gulf States company is one of the most progressive organizations in the country, and its efficient management has created comment throughout the entire country.

Here's the Results of Anchor Tests

[The Results of Tests Made at the Plant of W. N. Matthews Corporation in Presence of Ray Blain After Controversy on Patent Screw Type Anchors by Author and This Anchor Manufacturing Company. Written by Ray Blain.]

When I received the December TELEPHONE ENGINEER I was quite pleased to find on page 34 the following title, "Takes Ray Blain to Task," which was printed in very large type. Then, after reading the first paragraph of Mr. Claude L. Matthews' comment, I thought perhaps it would have been just as well had Mr. Smith not been quite so liberal with the size of the type used for the heading. But after reading the third paragraph I started out to find a buyer for one portable typewriter. I know now how the Spanish Navy must have felt after Dewey sunk their fleet and they lost their ships and all their anchors.

I received the December TELEPHONE ENGINEER in Denver and wired Mr. Matthews immediately that I would be in St. Louis December 31st, and would expect him to prove that his screw anchors would perform as he claimed; also that I desired to discuss anchors with him and that I barred nothing except the "Rabbit punch." Reply came back that Claude Matthews was out of the city until January 6th. I replied that I was coming anyway, as I must have satisfaction and busted anchors expected.

I arrived at the Matthews plant on the morning of December 31st, met Mr. W. N. Matthews, Mr. Clark and the bunch. They were all friendly and we talked about the weather and various subjects before opening on anchors. We had not progressed far on this all-important subject until we were informed that everything was in readiness for the anchor test if we would please step out in the yard. I will admit right here that I was surprised at this, for I did not think that they would attempt to prove to me that Mr. Matthews' remarks in the December TELEPHONE ENGINEER were correct. Frankly, I admit also that I was positive in my own mind that screw anchors of any type would not hold a maximum of 5,000-pound strain. When we went out into the yard I found a short, husky gin pole rigged with three guys and anchors to hold it in a perpendicular position. It only took a few minutes to bore a small pilot hole with an earth auger to a depth of about 5 feet. Then one of the 8-inch regular screw anchors was started into the ground. The anchor started right down with two men working the cross bar of the wrench very easily. It looked so easy that I thought perhaps there was some trick to it, so had them stop and let me use one side of the wrench, but found that I could keep my end going easily without puffing. The anchor went right on down until the mark on the wrench indicated that the eye of the 6-foot rod would come just above the ground level. Next the wrench was turned back slightly, wiggled a little and pulled easily out. The eye was next screwed on and the guy attached. The dynamometer was then connected up and the strain applied. The dynamometer

Dynamometer and pulling device on test anchor

climbed steadily upward and after it had passed the 3,000-pound mark I stood back, for I felt that it would not be long before the anchor would go places. No such thing happened, however, but, like the man's house built upon the rock, it stayed there. The dynamometer climbed steadily up to 9,200 pounds with a creep of the anchor rod eye of a little over an inch. This creep, I realize, was due only to the compression of the earth which had been slightly disturbed by the setting of the anchor. I feel certain that the most carefully set log anchor under a similar strain would have crept more than this. After reaching the 9,200-pound strain all slack was taken out of the pulling device and to attain the maximum 10,000-pound reading of this particular dynamometer would have necessitated a new set-up, which the Matthews gang were quite willing to do, but knowing I was whipped anyway, I refused to put them to any more bother. I don't doubt in the least, though, that this screw anchor would have held 15,000 and perhaps 20,000-pound strain without pulling out. With the 9,200-pound strain the earth was not cracked or disturbed and there was every indication that it was still as strong as the rock of Gibraltar.

I admit now that I made a mistake when I said screw anchors were not suitable for a heavy strain. I realize after the above test that they are as suitable for the guying of a heavy cable corner as they are for the smaller strain on the storm guy. I had some experience with screw anchors several years ago that was not entirely satisfactory and just have not considered them since. By not keeping up with the development of this type anchor I failed to realize that they had arrived at a point where they are entirely satisfactory. It is very difficult to keep up-to-date in the telephone game. This is not the first mistake I ever made and I don't expect it will be the last. People that do things, I have always heard, are bound to make at least a few mistakes. When a man tells you he never makes a mistake look at the rubber on his pencil. I do try to never make the same mistake twice. I do feel certain that I will not repeat the mistake regarding screw type anchors.

Mr. Matthews, in his comment, states that I either have had little or no experience in anchoring poles to the earth, etc. I cannot claim refuge in that even, for the doctor who ushered me into this vale of tears was paid (I don't know how promptly) with money Father earned from telephone work. I cut my teeth on a receiver cap and had a high chair with a glass insulator on each leg. I remember well my last spanking at about the age of six, which happened as follows: A fine, new, shaved pole had been set in front of our house and my brother and I decided that we would do some climbing. We each found a pair of 15-inch hooks and put them on by wrapping the lower straps around the ankle twice and the top ones in similar fashion above the knee. We couldn't climb over four or five feet, but we did it frequently. When father found us the soft white cedar pole looked like shredded wheat, which was the result of my first climbing and last spanking. My greatest thrill I remember was when the foreman told me that I was promoted from a "Grunt"

at 27 a month to a "Climb Some" at 30 and beans. I have never worked at anything except telephone work. I have worked in 22 different states and the Philippine Islands. I have observed closely telephone construction methods in Canada, Japan and China. This statement is not made with the idea of boasting, but only to prove that I should have known that screw anchors were suitable for holding heavy strains. Also that I believe I am capable of judging the performance of the right type anchor when

Gin pole guyed in place for anchor testing

I see one tried out on the proving grounds as described above.

Just one point in defense of my article in the October TELEPHONE ENGINEER which was misunderstood, no doubt, because I failed to make myself clear. The drawing was used to illustrate the necessity of having the rod at the anchor and the point of attachment on the pole in a direct line. The plate anchor in this case was used only as a symbol because it was easy to draw, and not with any intent of specifying that type anchor. The remarks made in this connection by Mr. Matthews in regard to the type of anchors and angle of guys are, however, entirely correct.

I want to thank Mr. Matthews for calling attention to my mistake, for I feel that I have benefited by his correction considerably. My only regret is that I have possibly caused injury to the W. N. Matthews Corporation and other manufacturers of screw type anchors. If this be true, I hope these few words will tend to convince the readers of the October TELEPHONE ENGINEER, who might have taken my statement in regard to screw anchors seriously, as the test made in St. Louis convinced me that screw anchors are all, yes, even more, than they are claimed to be. To you manufacturers, while I have for many years boosted patent anchors with the exclusion of the screw type, from now on I will be an ardent booster of them as well. In fact, I will be such a booster for patent anchors that I doubt seriously whether before long logs will be used other than in fireplaces, where they all rightfully belong.

And Here Is a Letter from a Matthews Customer

Gallatin, Mo., Jan. 7, 1930.

W. N. Matthews Corp.,
St. Louis, Mo.

Gentlemen:

While I am not a subscriber to "Telephone Engineer," I was very much interested in the article of a recent issue regarding patent anchors by Mr. Claude Matthews. The peculiar thing about this article was that it recalled to my mind my first experience in installing the Matthews Scrulix Anchors.

It was back in 1911 in the reconstruction of a cross arm lead after a big sleet storm in the Eastern part of this State when telephone lines were totally demolished.

Along in the latter part of June of that year we were placing anchors and here is the way we did the job. We used a two-inch earth auger for boring the pilot hole through the hard baked clay, tree roots and shell rock. The ground was very dry for that time of year. After the hole was bored down to the depth we desire to put the anchor, we filled this hole full of water, and using it as a lubrication, the Scrulix with the wrench furnished with it was started and put down to the required depth in a jiffy by two men at the wrench.

It has been 19 years since those good old days, and the anchors are still on duty.

Sincerely yours,

(Signed) N. E. BRANSON.

Dissolution Filed

Otto G. Fifield, secretary of state, has given notice by publication of the filing in his office the necessary notice of intention for the voluntary dissolution of the Rossville Home Telephone (Indiana) Company.

Similar papers have also been filed by the Moran People's Telephone Company and legal publicaton is given by the secretary of state.

The action is said to be the closing up process in the sale of the two companies to a syndicate operating a number of smaller exchanges throughout the state.

Pioneer John F. Tompkins Passes

It was with deep regret to the telephone fraternity to hear of the death of one of the "old guard," Mr. John F. Tompkins, on November 2nd last. Death came while he was making his home with his sister, Mrs. Nina Graham, of Columbus, Ohio. With 29 years in the telephone business behind him, Mr. Tompkins left a legion of friends, not only in the industry, but in every walk of life. At his death he was 70 years old.

Retiring in 1925 after many years' service, his autobiography reads as fiction. Born at Columbus, Ohio, and receiving his education at that place, he early started his business pursuit that was to lead him to various vocations, including clerking in a retail store, then bookkeeping; then several years as a hotel man and later spending several years in the merchant tailoring business. At this period he started his life's work of serving the telephone fraternity and followed this line with various companies until his retirement. His first position in the telephone industry dates back to 1896 while Frank Cook was interested in the Sterling Electric Company in Lafayette, Indiana. When Cook left, Mr. Tompkins moved to Chicago also and was made general sales manager of the Cook Electric Company. Leaving the Cook company in 1918, he connected with the Kellogg Switchboard & Supply Company and remained with them in the sales department till his retirement.

So endeth the life of one of our pioneers. May he rest in peace.

New York Rate Case Decision

A final decree was filed December 27th in the United States District Court for the Southern District of New York in the rate suit of the New York Telephone Company. This decree carries into effect the decision of the court announced on November 11, 1929.

The decree states the value for rate making purposes of the property used by the company in furnishing the classes of service for which the Public Service Commission had fixed the rates complained against by the company. Such value is found by the court to have been $400,571,699 as of July 1, 1926, and $475,590,609 as of July 1, 1928.

The court states that 7% is the fair return to be earned by the company on the value of its property. Having found that the present rates have fallen short of earning such return the Court declares them to be confiscatory and invalid and enjoins their further enforcement. The decree further permits the company to increase its rates to such extent as may be necessary to earn the return specified by the court.

A Reduction in Long Distance Telephone Rates

An Advertisement of the
American Telephone and Telegraph Company

ON JANUARY 1, 1930, there is effective a reduction in various long distance telephone rates in the Bell System which on the present volume of calls means a saving of more than $5,000,000 a year to the telephone-using public in the United States. This is the fourth reduction in long distance rates within a little more than three years. On October 1, 1926, they were reduced by $3,000,000. On December 1, 1927, a reduction of $1,500,000 went into effect. On February 1, 1929, there was a reduction of $5,000,000.

THESE REDUCTIONS are in accordance with the aim of the Bell System to continue to furnish the best possible telephone service at the least cost to the public. Earnings must, of course, be sufficient to permit the best possible telephone service at all times and to provide a reasonable payment to stockholders with an adequate margin to insure financial safety. Earnings in excess of these requirements will either be spent for the enlargement and improvement of the service, or the rates for the service will be reduced. This is fundamental in the policy of the management.

Distributing Association Handbook

[Increased Number of Copies of the 1929 Handbook Issued by the Illinois Telephone Association Makes This Issue Available to Many. This is the 9th Annual Edition and Contains Data, Specifications, Tables and Construction Rules]

Growing from a modest beginning nine years ago the 1929 edition of the Telephone Handbook of the Illinois Telephone Association is a most complete and useful reference book for telephone men. This year's handbook has been enlarged to 200 pages, having been thoroughly revised and brought up to date. It has been rearranged to conform with what would seem to be a more practical and easily read source of telephone information. In addition to the established features of the book, eight new sections have been added to the current edition.

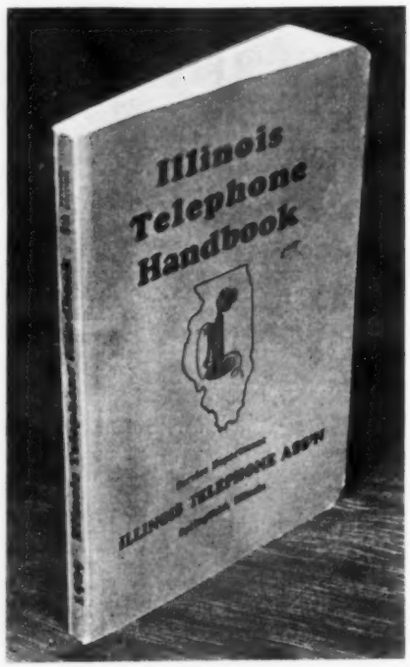
One of the outstanding points of superiority of the present handbook is the fact that seven separate and complete sets of indices make it possible to locate in an instant any detail discussed. A table of contents, placed well forward in the book, outlines the general section headings and is followed by the advertising index of manufacturers, jobbers, insurance companies, consulting engineers and supply dealers.

The section on rules for overhead line construction is divided into four parts, at the end of each part is a detailed cross index. These six indices are followed by a comprehensive cross index in the rear of the book, which is in the nature of a summary index. The location of any subject, no matter how small, is a comparatively easy procedure with this arrangement of indices.

The largest section in the handbook is devoted to pole data. This section opens with a description of the new pole preservative developed by the Western Union Telegraph Co. The specifications for this wood preservative treatment, commonly known as zinc meta arsenite treatment, are included in this section. This very interesting and informative material was furnished through the courtesy of the Curtin-Howe Corporation, which distributes ZMA.

Specifications of the National Electric Light Association and the American Telephone & Telegraph Co. for northern white cedar poles and western red cedar poles occupy a prominent place in the pole section. Pole inspection comments and suggestions, together with tables for "rot" inspection, will be found useful also.

The data and information concerning creosoted yellow pine poles will be found to be unusually complete. This section alone covers 19 pages, or nearly 10 per cent of the book. In addition to the specificaitons for creosote treatment, many tables of pole dimensions and weights are a part of this section.



Valuable Handbook of 200 Pages Issued by Illinois Telephone Association

An article on accident prevention in unloading poles is illustrated with five photographs showing the right and wrong method of doing this work. The pole section is concluded with a detailed set of instructions for unloading, counting and handling poles, as well as definite suggestions for the correct storage of poles.

The second largest general section is the one covering rules for overhead line construction. Four subdivisions of this subject appear under these captions:

1. General requirements for the construction and maintenance of communication lines.

2. Communication lines crossing the tracks of steam and electric railroads.

3. Communication lines crossing with underground construction the tracks of steam and electric railroads.

4. Communication lines where alone.

Those who have to deal with plant accounting will be interested in the section on the method of determining the dividing line bewteen depreciation and maintenance for accounting purposes. This material has been recently revised and it appears in the handbook in the form recommended in the proposed depreciation order of the Interstate Commerce Commission.

One of the most practical and thorough subjects added this year is entitled "The Storage Battery; Its Care and Operation in Telephone Service." . Nine illustrations are included in this material which explains storage battery operation. This section includes such items as types of storage batteries, parts of storage batteries, chemical action on charge and discharge, charging methods, floating batteries, cycled or charge and discharge batteries, equalizing charge, floating versus cycle charging, cleanliness, and other advice concerning the care and maintenance of telephone storage batteries.

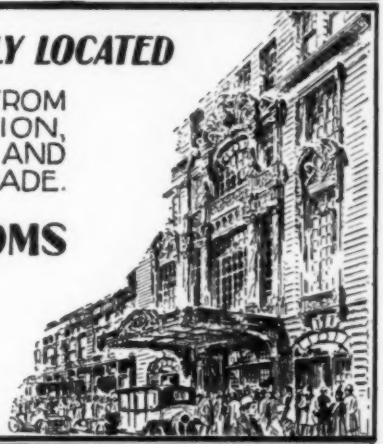
The first article in the handbook outlines and discusses in a very understandable manner 14 rules regarding standards of telephone service. Such topics as records and reports, elimination of crosstalk, permissible number of stations on a line, lines for through traffic, tests and inspections, traffic studies, provision for emergency, answering time, instructions to operators, directories, printing and posting rules, records of complaints, interruptions to service, maintenance of switching lines and toll service, are a part of this section.

One of the new articles this year concerns the transmission loss of telephone circuits. This section includes a chart which shows the comparative efficiency of 14 common types of standard nonloaded circuits and discusses the use of this chart in detail, giving examples of its application in every-day practice. Following this article are numerous tables of characteristics of copper and iron wire. This part of the handbook will be of special interest to wire chiefs and troublemen.

Many other subjects too numerous to mention are included in the Illinois Telephone Handbook, the most interesting of which will probably be found to be the sections on crossarm data, conduit data and similar information for plant people which is covered in a concise way.

In spite of the volume of information in the handbook, the size is but 5¼ inches in width by 7¼ inches in length. The right-hand corners are rounded so that the book may be slipped easily into

(*Continued on page* 42.)

HOTEL ATLANTIC
Famous for food
CLARK ST. NEAR JACKSON BLVD.
MOST CENTRALLY LOCATED
ONE BLOCK FROM LASALLE STATION, POST OFFICE, AND BOARD OF TRADE.
450 ROOMS
$2.00 UP
WRITE FOR FOLDER

CHICAGO

KESTER FLUX-CORE SOLDER
FLUX IN POCKETS
SOLDER WALL
Ready to Use
Needs only Heat

QUICK!
One operation—no separate fluxes, acids or pastes—the flux is right in the core. Positive protection against increased resistances due to corrosion and leakage. Quick, simplified soldering reduces the cost of operation and maintenance. Use Acid-Core for iron lines, Rosin-Core for delicate work. If you have special needs, consult our experimental and research department.
From all jobbers.
Kester Solder Co., 4218 Wrightwood Ave., Chicago, Ill.
Established 1899—Formerly Chicago Solder Co.
KESTER FLUX-CORE SOLDER
ACID-CORE ROSIN-CORE PASTE-CORE
METAL MENDER RADIO SOLDER

AUDITORS, ACCOUNTANTS and SYSTEMATIZERS for *PUBLIC UTILITIES ONLY*

More than 1,000 Telephone Companies, our Clients

CONSULT YOUR BANK FOR OUR REFERENCE

COFFEY SYSTEM AND AUDIT CO.

Certified Public Accountants

15th Floor Consolidated Bldg. Indianapolis, Ind.

Stromberg-Carlson at Aurora, Indiana

Southern Indiana Telephone Company Purchases Four Section Central Energy Switchboard and Equipment for Hoosier Town. Now Have Very Modern Plant

August 30 was a big day in the history of the town of Aurora, Ind., for it was on this day that the Southern Indiana Telephone Company replaced its out-of-date switchboard and equipment with up-to-date Stromberg-Carlson central power equipment.

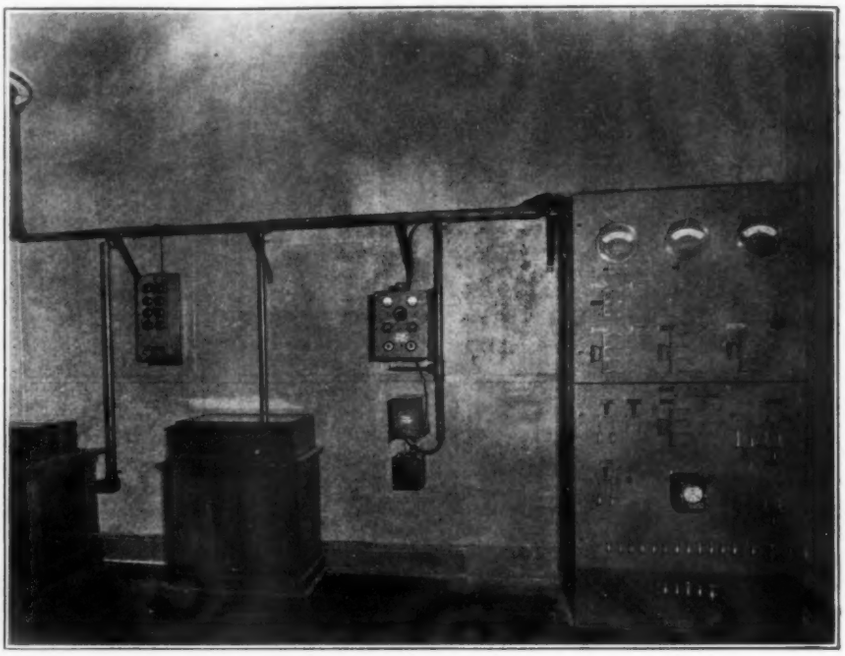
The installation of the new equipment at Aurora was part of a $40,000 improvement of the Southern Indiana Telephone Company.

The entire improvement plan was the result of a complete study made by Prof. R. V. Achatz, General Manager of the Southern Indiana Telephone Company and formerly of the School of Electrical Engineering at Purdue University.

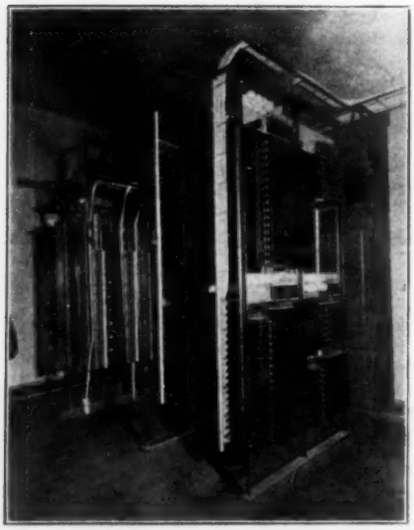
At the time Mr. Achatz took a position with the company he immediately started a study of the entire property and outlined an improvement program, based on the growth of the company for the past 20 years.

In the survey it was found that the continued growth of the company made it necessary to replace the old switchboard at Aurora, installed twenty years ago and which at that time was the most modern type available for an exchange the size of Aurora, with complete new apparatus.

As a result of this long study the officials of the company decided to replace the Aurora equipment with a modern type and in January contracted with Stromberg-Carlson Tel. Mfg. Co. of Rochester, New York, for a four-section central energy unit type of switchboard and equipment. The board consists of 400 subscribers, 100 convertible, 35 rural and 20 toll lines and has complete power, terminal and machine equipment. Wire Chief and Chief Operator desks were installed with the new system.



Stromberg-Carlson power board and converter with associated charging and ringing equipment at Aurora, Indiana



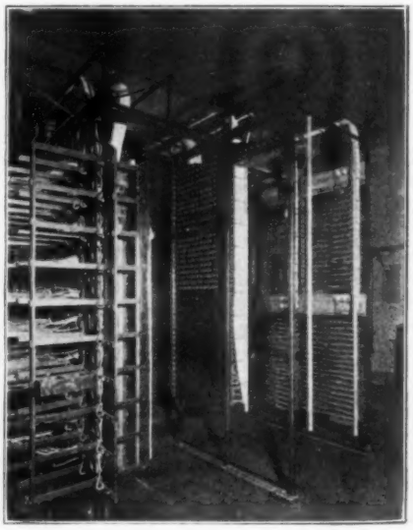
Front view of the relay and terminal equipment installed in connection with the Stromberg-Carlson switchboard at Aurora, Indiana

Immediately after the contract was signed The Southern Indiana Telephone Company ran advertisements in the Aurora paper telling of the new purchase and gave the public instruction as to how the Stromberg-Carlson equipment would operate and just how it would be an improvement over the old system. Stromberg-Carlson supplied the company with a demonstration board of the same type purchased and the telephone company held demonstrations showing its customers and the public just how the new equipment would operate after it was installed.

In educating the public by advertising, the telephone company explained that in the new equipment all the current for ringing and talking purposes comes from a large storage battery in the Central Office and that the telephone at the subscribers' premises no longer requires dry cell batteries or the hand generator for signalling the operator.

It was also brought out by the company that the placing of the battery at the central office permitted many refinements of the equipment and provided opportunity for many features which

(*Continued on page* 40.)



Rear view of terminal and relay racks at Aurora, Indiana

TELERING

For Central Office and PBX Ringing

ONE REED!

ONE CONTACT!

IDEAL WAVE FORM

ORDER ONE ON TRIAL.

NO OBLIGATION TO KEEP.

Fully Guaranteed

Converts 60 Cycle Lighting Current to 20 Cycle Ringing Current.

POSITIVELY NO RADIO INTERFERENCE

Very low current consumption.

Model EX-3 has been proven the ideal ringing machine by hundreds of satisfied users.

Price $44.00—F. O. B. Elyria

IT PAYS FOR ITSELF

Sold by Leading Telephone Distributors

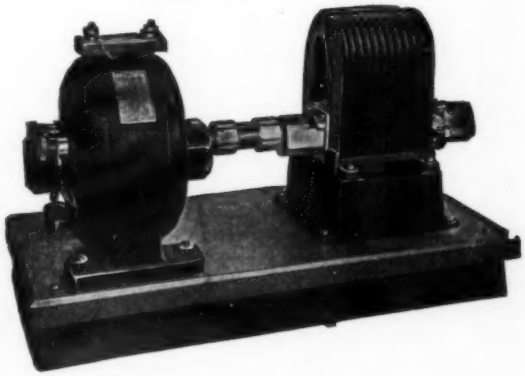
Telkor, Inc., Elyria, Ohio

(Write for booklet)

HOLTZER-CABOT

Magneto - Ringing - Motor - Generators

Maintain Better Service



Maintaining an efficient, economical, carefree ringing service need not be a problem—bit it does require good judgment in selecting your equipment.

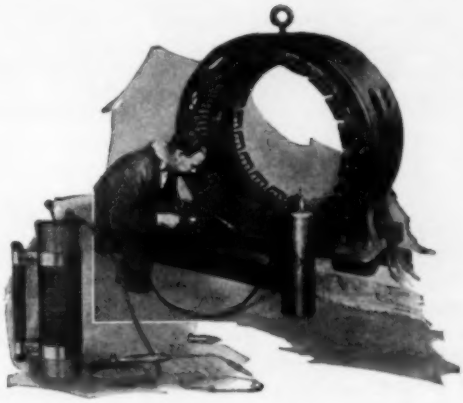
Install Holtzer-Cabot Magneto Ringing Motor Generators. These units will enable you to dispense with battery maintenance and constant service diligence. Can be supplied for any voltage or special current.

We invite correspondence. Complete data on request.

HOLTZER-CABOT ELECTRIC CO.

125 Amory Street, Boston, Mass.

6161 So. State Street, Chicago, Ill.



Prest-O-Lite Is The Modern Blow-Torch

. . . Instantly ready, simply turn on the gas and light it . . . no lost motion . . . operates unfailingly and efficiently in any kind of weather, inside or out of doors . . . Moderate initial cost and economical—wastes no fuel between jobs—lasts indefinitely.

Prest-O-Lite torches fit every blow-torch need—do every heating, brazing or soldering job quicker, easier, better and at lower cost.

'Phone the Prest-O-Lite Gas Distributor about this equipment or write us direct for complete information.

Prest-O-Lite is available everywhere. Anyone of 15,000 Prest-O-Lite Exchange Stations can supply you quickly with a full tank.

Prest-O-Lite GAS

THE PREST-O-LITE COMPANY, Inc.

Unit of Union Carbide and Carbon Corporation

UCC

NEW YORK, N. Y.
Carbide and Carbon Building

SAN FRANCISCO, CAL.
Adam Grant Building

IN CANADA: The Prest-O-Lite Company of Canada, Ltd., Toronto

Stromberg-Carlson at Aurora

(*Continued from page* 38.)

greatly improve the convenience, speed and accuracy of the service to the subscriber. The advertisements read further:

"The more important features are lamp signals machine ringing and an audible ringing tone, positive disconnecting signals, flashing recall and other points that have eliminated many annoying features of the old service."

After the installation the company declared "the improvement is truly noticeable in the service, which although it has been in service for a short time is commended by all who have the use of it. A statement from one business house is that the improvement is 100 per cent over the old service."

The Southern Indiana Telephone Company occupies the entire second floor of the Aurora State Bank building and those citizens who are given to retrospection will favorably compare the well appointed home of the company with the little two-room office used several years ago. The office "matches up" with offices in towns much larger than Aurora, in an area serving far more subscribers.

The equipment room and battery station is of the most up-to-date-type with every up-to-date improvement to provide better service. The operating room or switchboard room makes an attractive appearance. It has been thoroughly renovated, newly plastered and decorated and equipped with modern features of operating room equipment. The floor is covered with battleship linoleum. A well-appointed rest room for the women employes is furnished with a handsome suite of wicker furniture and everywhere a keynote of comfort is noticeable.

New lighting fixtures are used throughout the rooms. An electric cooling system for drinking water is another modern feature of the office.

The modernization of the telephone system at Aurora is an example of the foresight and progressiveness on the part of the company management and an expression of its determination to provide up-to-date service to the area which it serves.

Reorganization

The new Mansfield Telephone Company (Ohio) reorganized this year, asked authority of the State Utilities Commission to take over the old company of the same name which was organized in 1898.

The valuation of the company properties was fixed at $2,195,182.79. In payment the new company asked the commission to authorize issuance of $1,021,500 in 5 per cent bonds and 30 shares of no par common stock.

Book Review

Radio Telegraphy and Telephony by Rudolph L. Duncan and Charles E. Drew. John Wiley and Sons, New York. $7.50.

This 900 page book is designed to be not only a text book for students but a handbook for practical use after the student enters the radio operating field. The first 200 pages are devoted to fundamentals of electricity. This is followed by a 300 page section on vacuum tubes and the various applications of vacuum tubes in receiving circuits. The remainder of the book is devoted principally to transmitting apparatus of various types. One chapter is devoted to radio telephone broadcasting transmitters and one chapter to radio direction finding. There is an appendix of useful numerical tables and the book has a fairly complete index. The practical nature of the work will make it a valuable handbook not only for radio students but for those who have already entered the field of actual radio operation.

Private Automatic Branch Exchanges, by R. T. A. Dennison; Isaac Pitman and Sons, New York. $3.75.

This is a book descriptive of practice in England in the field of the private automatic branch exchange. It assumes that the reader has some familiarity with the general principles of automatic telephony and confines itself to the application of these principles to that types of automatic branch exchanges that have been developed by British manufacturers. The systems covered are the Relay Automatic Telephone Co.'s 24 volt and 32 volt systems, The Standard Telephones and Cables system, the Automatic Telephone Manufacturing Co.'s system based on the standard Strowger system of automatic switching and the Siemens Bros. & Co.'s system. The mechanical details of the various systems are given and the reader is led step by step through the various operations incidental to setting up the connection. The book will be a valuable aid to those who wish to familiarize themselves with systems other than those used in this country.

Changes Name

P. C. Holdoegel, manager of the Central Mutual Telephone Company which serves Lake City, Iowa, and vicinity, announced recently that the name of the company will be changed to the Iowa Continental Telephone Company, but there will be no change in ownership, management or policy.

Studying Telephone Methods

(*Continued from page* 21.)

still operated. This prevents "H" from releasing. Then the release trunk coming from the line switch, will find a ground through the normal contacts of "G," through the 125 ohm winding of "H," to the private wiper, which is still grounded by the make contact of the "H" relay. Thus any switch calling this connector will find a 125 ohm ground on the release trunk. This will cause the calling switch to pass on to the next contact.

With "A" and "B" still released, and "D," "F" and "H" still operated a circuit can be traced from the grounded armature of relay "A" normal contacts of relay "B". Make contact of relay "D" to the supervisory lamp and main battery. This gives a visual signal of switches held up by the called subscriber. When the called subscriber hangs up his receiver the release circuit is closed at "D" and the switch releases.

The release magnet is 100 ohms. To prevent sparking at the off normal contacts when the switch releases, there is a 500 ohm non-inductive winding bridged across the release magnet to absorb the counter current set up in the release coil when the battery is cut off. This method is very effective and can be used in most cases to prevent sparking at contacts.

Increases Capital Stock

The Rochester Telephone Company (Indiana) has just had the approval of the Secretary of State and the Public Service Commission to increase its capital stock to $300,000.00, to change its bonded indebtedness into 6 per cent preferred stock, and to issue and sell 6,500 shares of common stock in order to pay for additions and improvements to the plant and to retire a book surplus which has been accumulating, a little from year to year, since the organization of the business thirty-three years ago.

State Sells Telephone Company

Following the sale of the Farmers Telephone company of Donaldson, Minnesota, to L. H. Saverin of Donaldson, the state of Minnesota today had disposed of its last telephone company. The company was purchased by the state at a judicial sale to enforce payment of $286.50 gross earnings taxes.

Silver Anniversary

In connection with the twenty-fifth anniversary of the Lincoln Telephone and Telegraph company, Frank H. Woods, founder and president, was the guest of honor at a dinner given by the officers and directors of the corporation recently at the Cornhusker hotel. A large crowd of independent telephone executives were present.

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Takes the place of 6 men . . .
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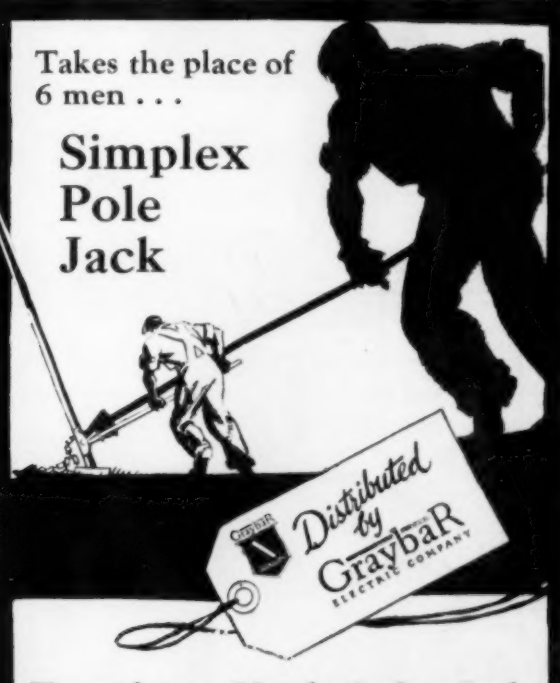

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Plain or Treated Butts
Prompt Shipment from Minneapolis Yard.
T. M. Partridge Lumber Co.
Minneapolis, Minn.

Templeton, Kenly & Co., Ltd.
Sole Manufacturers
Established 1899 Chicago, Ill., U. S. A.

Distributing Association Handbook

(*Continued from page 36.*)

the pocket. The accompanying photograph gives a good idea of the appearance of the handbook. The cover is of a heavy silver-embossed stock with a rich metallic finish, making a very attractive book.

An advertising section carries timely messages from 24 leading manufacturers, jobbers, supply dealers, public utility insurance companies and consulting engineering firms.

Requests in past years far exceeded the total number of handbooks printed. For that reason the number of handbooks printed this year was substantially increased, thus making additional copies available for distribution among the industry. As a measure of cooperation with all telephone companies, the Illinois Telephone Association, Springfield, Ill., will furnish copies of the Illinois Telephone Handbook at the actual cost of printing as long as they last. These handbooks will make excellent Christmas gifts.

With the Manufacturers and Jobbers

Proper Chairs Are Important

Realizing more and more the importance of right posture and its effect on health and efficiency in industry, particular attention is being paid by business leaders to the development of chairs which will establish and maintain correct seated posture for men and women at work.

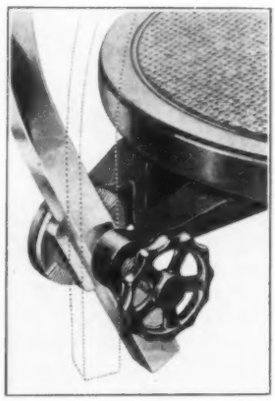
Especially at the telephone switchboard, where fatigue is a pernicious enemy of service, investigation has proved that it is vitally necessary to provide chairs which will give a normal and restful seated position to the body.

Dr. Garner, chief surgeon of the Atlanta and West Point Railroad and one of the country's foremost authorities on the subject, says that there is a definite relation between correct seated posture and increased efficiency—better health. Other eminent industrial physicians stress the advantages to be gained in higher morale, not to mention a finer quality of productivity, by providing their employees with a new kind of chair in which it is possible to sit correctly.

This is the so-called posture chair which is adjustable to the physical requirements of the occupant. Being designed scientifically along anatomical lines it not only makes correct posture possible but automatically induces a healthful seated position.

With the development of a posture chair expressly for the use of switchboard operators, great possibilities for the improvement of service are opened to the telephone industry. Former objections based upon the necessity of quick adjustment changes for changing shifts, have been overcome by simple mechanisms that permit instant vertical and lateral adjustments without any loss of support-rigidity which is vital to proper seating.

With its anatomical and adjustable features the telephone operator's chair corrects the evils of improper posture—sagging body, cramped lungs, displaced organs, muscular and nervous strain—all the factors which prey on health and efficiency.



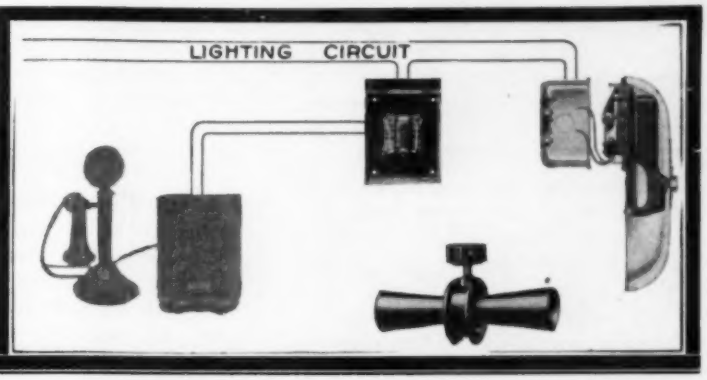
Adjustable back rest feature on Do/More telephone operator chairs. Vertical and lateral adjustments are simultaneous.

The effect of a true posture chair is to promote full lung capacity breathing,

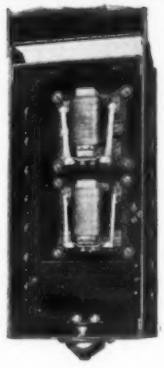
Do/More telephone operator chair, Model "WC", embodying correct posture features. Combination wood and cane seat

Do/More telephone operator chair, Model "GL," embodying correct posture features. Genuine leather seat and back

Extra Profits in Installing



Signal Engineering Telephone Extension Ringing Sets



Locking Relay Set

For use on such applications as police and taxicab visual and audible signalling. Also throughout industrial plants where loud signals are desired to be operated on lighting circuits.

Approved by Underwriters' Laboratories, Inc.

Products: Fire Alarm Systems, Vibrating Bells, Horns, Single Stroke Bells, Whistles, Special Tone Signals, Code Calling Systems, Tank Alarm Systems, Relays.

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Dependable!
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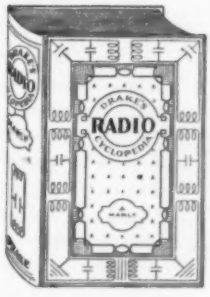

DRAKE'S RADIO CYCLOPEDIA
By HAROLD P. MANLY

A Complete and Non-technical Reference Work, covering nearly 1700 subjects arranged alphabetically, including instructions for building, operating and testing receivers, power units and radiophone equipment. Arranged for use by set builders and designers, service and repair men, dealers and salesmen, experimenters and students, set owners and operators. 871 Pages. Size 6x9". 985 Illustrations, Circuit Diagrams, Constructional Layouts and Graphic Curves. All made especially for this book. Bound in Art Buckram. Stamped in Two Colors. Price $6.00

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192 N. Clark St., Chicago, Ill.

natural, normal position of the abdominal organs, free circulation of the blood. It makes for natural elimination, unstrained nerve system and reduction of muscular effort. It keeps the worker erect and alert.

Throughout the country in telephone exchanges where these scientifically designed posture chairs have been installed, the efficiency and morale of the operators have been definitely increased and strengthened to an incredible degree. Results are noticeable in the better health, greater cheerfulness, less fatigue and in the appreciation and loyalty of the operators themselves.

Posture chair manufacturers have given much study to the developments of correct posture chairs and experience is convincing the executives of telephone companies that correct posture at the switchboard is a most vital necessity for the most satisfactory service.

Stromberg-Carlson Representatives Hold Meeting

Thirty-five branch managers, officials and representatives of the Stromberg-Carlson Telephone Mfg. Co., representing the United States from Coast-to-Coast held a business meeting December 17 at the Stromberg-Carlson plant in Rochester, New York.

The sessions of the conference were all held in the plant and a luncheon was served in the plant dining room. A dinner and meeting were held at the Genesee Valley Club in the evening.

Out-of-town managers who attended the meeting follow: Benjamin Gross, H. A. Brennan, L. L. Spencer, Gross-Brennan, Inc., New York City; R. Davis and C. J. Hunt, Davis-Hunt, Inc., Philadelphia; J. E. McCauley and A. B. Crawford, McCauley-Crawford, Inc., Pittsburgh; C. E. Heston, Cincinnati; N. W. Baldwin, Toronto; C. W. Schafer, Paul Meyers, A. C. Barg and Everett Worthington of Chicago; C. D. Kinne, Kansas City, O. C. McCanne, St. Louis; R. G. Bookless, Garnett Young and Company, Los Angeles; F. C. King, Scoville Mercantile Company, Atlanta, Georgia; and L. A. Randall, Baltimore.

The Rochester officials and representatives who were present follow: W. R. McCanne, President and General Manager; George A. Scoville, Vice-President in charge of sales; E. A. Hanover, Vice-President, in charge of production; Ray H. Manson, Vice-President, in charge of engineering; B. Woodbury, special representative; E. A. Reinke, chief Sales Engineer; W. T. Eastwood, advertising manager; E. R. Stonaker, consulting traffice engineer; J. S. Gibson, radio manager; D. W. Brown, manager Rochester Sales; F. K. Cannon, export manager; J. W. Kennedy, Rochester sales department; F. N. Anibal, special representative in Rochester; S. H. Hanford, L. A. Cassler, F. B. Farley and R. C. Reno of Lyddon, Hanford and Kimball.

Strong Penetrating Power

Credit Ray-O-Vac flashlights with one more life-saving job. Here's the how of it: On the night of November tenth, the Southern Pacific's crack West Coast Express was speeding on its way from Los Angeles to Seattle. Suddenly, as the train neared Saugus, Calif., the beams of the headlight picked out a huge obstruction on the track. Engineer Ball applied the air, but the train's momentum carried it into the obstruction, which had been placed on the track by bandits.

The locomotive and two cars left the track and piled up in the ditch. Engineer Ball was imprisoned in the wreckage of the cab in a cloud of smoke and live steam. The train crew and passing motorists hurried to his assistance, but the feeble glow of their lanterns failed to penetrate the steam clouds in the pitch-black night.

A young man, J. B. Armstrong, who was driving home from a Sunday trip, saw and heard the crash, and was soon at the scene. He, of all the rescuers, carried a flashlight. The fireman was trying to pierce the gloom with his oil lantern, when young Armstrong appeared. The Ray-O-Vac was at once commandeered and with its aid Engineer Ball was removed from his prison.

"That flashlight sure could throw a beam of light right through the smoke," said Armstrong later. "We found the engineer without any trouble, while the other lanterns were worse than useless."

Southern Pacific officials presented the young hero with a new Ray-O-Vac Flashlight and a suit of clothes to replace those he had ruined in the rescue. It is understood that since November 10 Ray-O-Vac Flashlights are favorites among Southern Pacific employees. They know their worth!

The Waterbury Telecell

A "Dry" Caustic Soda Primary Battery Cell

The Waterbury Telecell manufactured by The Waterbury Battery Company, Waterbury, Conn., is a recent development in caustic soda primary battery construction. It is a dry-wet battery of the utmost simplicity of installation. It is made operative by simply adding water.

The Waterbury Telecell is a self-contained unit, all parts being hermetically sealed in a glass jar. The copper oxide is sealed in a perforated metal container and automatically becomes available when the the electrolyte is made. The zinc is a specially prepared amalgamated zinc cylinder containing little bars by which the life remaining may be estimated. The caustic soda is in the form of fused cakes which are made by a special process perfected by The Waterbury Battery Co. The battery oil is liberated by the action of the cell after the water is added to make the electrolyte.

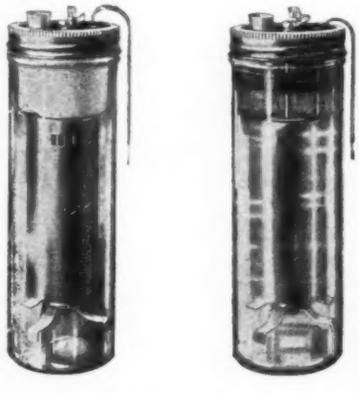
The Waterbury Telecell is small and compact, being but slightly larger than the standard size dry cell—9 ins. by 2¾ ins. overall. It has a capacity of 75 ampere hours. It will deliver over 50 ampere hours at a continuous discharge rate of 1 ampere. The rating is conservatively low as there is no deterioration in stock.

Maintenance is reduced to a minimum by the long life of the cell and because it gives an advance indication of approaching exhaustion. The Waterbury Telecell retains the usual characteristics of caustic soda primary battery, i. e., reliability, constancy of voltage and high efficiency.

The Waterbury Telecell is suitable for open or closed circuit work and is especially applicable to the various classes of telephone or other service where uniformity of voltage is required.

The Telecell is usually connected in series and seldom requires a multiple connection. One hundred and eighty milli amperes is a very light discharge rate. the cell delivering its rated capacity at one-half ampere continuous discharge.

One of the advantages in the use of Waterbury Telecells in telephone circuits is their quite rapid drop from their initial voltage to their operating voltage. This drop is much less than the drop in a dry cell which is from 1.5 volts to approximately .9 of a volt during its life. The voltage drop curve of the Waterbury Telecell is a very gradual drop over a long period of time and this curve is between the maximum and minimum voltages of dry cells thus insuring a very good voltage for talking circuits. The voltage of the Telecell is much more consistent than any of the small batteries used for this kind of work. After



Waterbury Telecells

the initial drop there is a very slow and hardly appreciable drop in the voltage of the cell, the cell thus operating at an almost constant voltage and one at which the operating conditions are very favorable.

The Waterbury Telecell at present is being used by various railroads throughout the country and was selected by the Byrd Antarctic Expedition for use in the Antarctic. The Waterbury Battery Company has been manufacturing primary batteries exclusively for over thirty years and this product is one of the latest developments, embodying a lifetime of experience in its manufacture. In addition to the Waterbury Telecell the Waterbury Battery Company manufacture various types of cells applicable to telephone use varying in capacities from 125 ampere hours to 1000 ampere hours.

Stromberg-Carlson Loud Speaker Approved by the Underwriters' Laboratories

The No. 25-A Electro-Dynamic Cabinet Loud Speaker, manufactured by the Stromberg-Carlson Company, has been approved and listed as standard by the Underwriters' Laboratories, according to an announcement made by Stromberg-Carlson.

With this approval, the entire Stromberg-Carlson line of receivers and loud speakers taking current from the electric light socket has been inspected, approved and listed as standard by the Laboratories. The approval line includes the No. 641, No. 642 and No. 846 Radio Receivers and No. 25 Electro-Dynamic Speaker.

The importance of having radio receivers listed as approved by the Underwriters' Laboratories has been called to the attention of the public by the notification that a local ordinance in Richmond, Virginia, requiring all household electrical appliances be approved by the Underwriters' Laboratories. Similar conditions also exist in some other cities. In all probability a uniform ordinance covering this subject will be available for all cities and municipalities of this country in the near future.

The No. 25 Electro-Dynamic Speaker, free from all fire and safety hazards, has a ten-inch corrugated cone, with a specially made "lively" diaphragm. Hum is kept down to an imperceptible degree, there being no balance to adjust or maintain. The use of a cabinet, permitting scientific baffling, insures new beauty of tone in the lower frequencies. Operating power for the speaker is supplied by a UX-280 Rectifier Tube contained within the Speaker Cabinet. A switch is inside of the cabinet and A. C. outlet is in the bottom for operating with receivers not equipped with loud speaker A. C. outlet.

Evolution of Harrisonville, Mo., Exchange

By E. R. Sears

Sales Representative, Kellogg Switchboard & Supply Co.

The early history of the Cass County Telephone Company is interesting because of the late W. B. Scruggs' struggles for its promotion, and, incidentally, of his services to Harrisonville, for the progress of his efforts is paralleled by the progress of Harrisonville.

It was during Mr. Scruggs' early business career that his acumen was manifested, for he carefully watched the development of the telephone, both as an industry and as a home and office convenience. He believed the people of Harrisonville would patronize a company that would guarantee them good telephone service. This belief proved his keen foresight, for it was well founded. With this idea in mind he organized the Cass County Telephone Company, the organization receiving its franchise in January, 1898.

A 100 line switchboard was installed in the office at 300 East Wall street, which was opened for business June 15, 1898. By July 1st the subscribers had grown from forty to sixty-six.

FOR SALE

2 conductor black silk desk stand and receiver cords, per set, 40c. W. E. No. 47 fuses, $6.00 per 100. W. E. No. 14 terminals, 16 pair less stubs @ $4.00. W. E. NEW 3 conductor swbd. cords with No. 109 plugs attached, 50c. Heminway No. 42 glass insulators @ $5.00 per 100.

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Specialization on Public Utility Accounting Records and Audits enables us to best serve Telephone Companies.
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Certified Public Accountants
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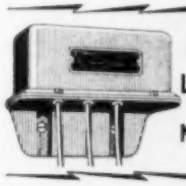
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400 Newly Furnished Rooms
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Sample Rooms
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$7.00 and $8.00

Dearborn St. from Jackson to Quincy
New Garage One-Half Block

By 1902 the company had outgrown the original 100 line board and Mr. Scruggs, with good service still in mind, placed an order with the Kellogg Switchboard and Supply Company for a 300 line magneto switchboard. This was one of the first magneto boards the Kellogg Company manufactured, as it was No. 472. Since that time the Cass County Telephone Company has standardized on Kellogg equipment.

Mr. Scruggs' death occurred in December, 1925, after which his daughter, Miss Wilma Scruggs, was appointed General Manager of the company.

By this time the number of subscribers had reached a figure well over a thousand and Miss Scruggs started laying plans for a new common battery system. Consequently, in keeping with her father's policy of rendering the best and most efficient service possible at a minimum cost, Miss Scruggs placed her order again with the Kellogg Switchboard and Supply Company for a two-section six-position service switchboard and 650 common battery telephones.

The switchboard consists of one hospital position, two toll positions, one rural position, and two full feature local positions having the following features:

Keyless listening,
Machine ringing,
Double disconnect,
Line lamp recall,
Revertive ringing tone,
Multiple line lamp call distribution,
Dark key shelf,
Secret service,
Non-interference.

The old office was moved back and a modern building was erected in its place. The new building that houses the Kellogg board is of modern design and construction with an exterior of buff face brick with darker face brick and terra cotta trim. The commercial office and operating room are on the west, with the terminal room and operators' rest room on the east. The switchboard is set in the partition between the operating and terminal rooms, which makes a very efficient and desirable arrangement.

After a construction program which covered a period of six months and a total expenditure of over $65,000.00, the new equipment and outside plant were cut into service on September 1, 1929, at 10 p. m. The cutover was the climax to the work of rebuilding the entire outside plant, erecting a new building, and installing over 600 Kellogg common battery telephones.

The Plant Department of the company is under the direction of John H. Patterson, Plant Superintendent, who is the veteran of the company, having been with it since it was organized. The commercial work is in direct charge of Miss Wilma Scruggs, who is ably assisted by her sister, Mrs. S. J. Wooldridge.

Nine hundred people were the guests of the company on October 12th from 10 a. m. to 10 p. m. The occasion was an "open house" to the public. This event Miss Scruggs had planned for some time and it is doubtful if anyone enjoyed it more than she. The reception was held in the new building. A continuous stream of visitors filed through the building into the terminal and operating rooms where the operation of the equipment was explained by the employees of the company and representatives of the Kellogg Switchboard and Supply Company. Refreshments were served to all and there were roses for the ladies and cigars for the gentlemen.

Harrisonville is a thriving city of 2500, the County Seat of Cass County, located forty miles south of Kansas City on Highway No. 71. Beyond a doubt Harrisonville subscribers are now enjoying telephone service equal to that of any city in the United States.

RECONSTRUCTED EQUIPMENT

Western Elec. No. 143 Receivers with cords @	$ 1.25
Western Elec. New No. 143 Rec. Shells with cap @	.37
Automatic Elec. Slip type receivers with cord @	1.10
Kellogg 3-bar 1000 or 1600 ohm Bdg. desk set with inside connection signal sets @ $10.00—4-bar $10.75—5-bar @	11.50
New Rebuilt Short type cabinet inside connection magneto compacts with Kellogg or Western Electric Transmitters & Rec., 3-bar 1000 or 1600 ohm $9.50—4-bar @	10.50
Kellogg No. 2696 type 4-bar 1000 or 1600 ohm Compacts @	8.50
Kellogg No. 6 Cordless P. B. X. board with 6 local lines and 2 trunks	50.00
Western Elec. No. 20 C. B. Ind. Coils @	.35
New Magnetizer for recharging magnets; works off 6-volt storage Batt.	6.25
Gray Desk or wall type 3-slot pay station @	5.75
Dean C. B. Steel hotel sets with straight line or 16-33-50 or 66 cycle ringers @	4.75

Write for Our Bulletin

REBUILT ELECTRIC EQUIPMENT CO. Not Inc.
1940 W. 21st St., Chicago

Common Battery Oak Residence Type Wall Sets

Kellogg F-729-SA straight line ringers $5.75

Kellogg F-729-HA or HB harmonic or syncromonic ringers $6.25

Leich Elec. Co. 29-A induction coil type, straight line $4.50

Leich Elec. Co. 29-C harmonic or syncromonic $5.00

Buckeye Telephone & Supply Co.
COLUMBUS, OHIO

FOR SALE

4-Position Western Electric Co.—1248 Common Battery Lamp Switchboards, equipped for 740 lines. One of these positions equipped with 15 pr. Universal Toll and Local Cord Circuits.

1—Mercury Arc Rectifier—10 Amp. Capacity.

1—Gasoline - Generator Set—24-36 Volt—20 Amp.

75—No. 294 Western Electric Co. Sub-Sets, Less Receivers.

To move quickly this equipment can be bought cheap.

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